Operation/Reference Guide

MVP-8400i

8.4" Modero® ViewPoint® Touch Panel with Intercom

Touch Panels

Last Revised: 1/4/2013

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- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC RF Radiation Exposure Statement

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed an operated with a minimum distance of 20 centimeters between the radiator and your body.

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MVP-8400i Modero Viewpoint Wireless Touch Panel With Intercom

Overview

The MVP-8400i Modero Viewpoint Wireless Touch Panel (FIG. 1) is a 8.4", 802.11-based wireless handheld G4 touch panels, pre-installed with an 802.11 Wi-Fi Interface Card to communicate with a NetLinx Master via a standard 802.11g Wireless Access Point.

The MVP-8400i features full-duplex intercom functionality.

FIG. 1 MVP-8400i Touch Panel

- MVP panels feature nine programmable external pushbuttons and two programmable LEDs, and support AMX G4 graphics technology, making them compatible with AMX's TPDesign4 Touch Panel Design program.
- MVP panels utilize two IR frequencies (38 KHz and 455 KHz) as well as 2 additional user-defined IR libraries, on 4 IR ports.
- MVP panels feature programmable firmware that can be upgraded via either the wireless interface card or the mini-USB port. MVP panels utilize unique firmware kit files that can be downloaded from www.amx.com.
- MVP panels support *AMX Computer Control*, which enables remote viewing and control of any networked computer directly from the panel. This gives the user the ability to launch digital music from a PC, cruise the Internet, check and respond to E-mail, open software files, and launch applications.
- MVP panels come equipped with a battery and power supply (see specifications).

Optional AMX accessory solutions for the MVPs include

- MVP-TDS Table Top Docking Station (see the *MVP-TDS Table Top Docking Station Operation/Reference Guide* for details).
- MVP-WDS Wall/Flush Mount Docking Station-Black/Silver (see the *MVP-WDS Wall Docking Station Operation/Reference Guide* for details).
- MVP-KS Kickstand (see the *MVP-KS Kickstand Operation/Reference Guide* for details).

Specifications

- The MVP-8400i panel utilizes an 8.4" Color Active LCD to display an 800 x 600 pixel resolution using 256K colors.

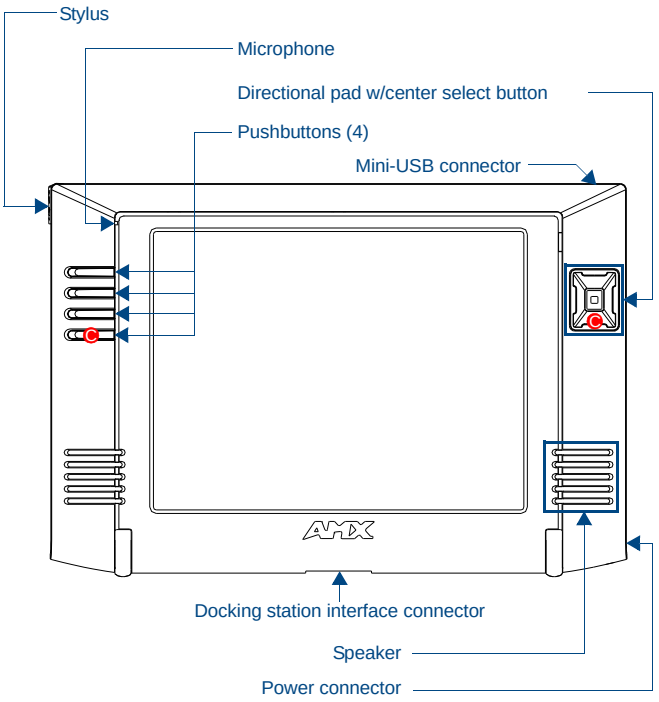


FIG. 2 MVP Touch Panels

MVP-8400i Specifications (FG5965-04)	
Dimensions (HWD):	7.09" x 10.47" x 1.47" (18.00 cm x 26.60 cm x 3.73 cm)
Power Requirement (without charging):	Panel with batteries fully charged or with no batteries: • Constant current draw: 1.3 A @ 12 VDC • Startup current draw: 1.9 A @ 12 VDC • If panel is mounted onto a TDS or WDS, add 0.1 A to the above figures.
Power Requirement (while charging):	Panel while charging batteries: • Constant current draw: 3.3 A @ 12 VDC • Startup current draw: 3.9 A @ 12 VDC • If panel is mounted onto a TDS or WDS, add 0.1 A to the above figures.
Minimum power supply required:	PS4.4 Power Supply **(FG423-45**) - All MVP models are shipped with this power supply.
Power Modes:	• ON: Panel is fully functional. • STANDBY: Panel uses low power, the LCD/backlight is shutdown, LEDs still function. ***Panel resumes the ON mode in ~ 1 second.*** • OFF: On-board programs not running, touch screen still powered, LED not functional. ***Panel resumes the ON mode in ~ 30 seconds.***
Battery Duration: (per battery)	• Eight hours of normal use (25% On state, 25% Standby, and 50% Off). • Four hours of continuous use (continuous On state). The MVP-8400i panel is shipped with two MVP-BP batteries. You must use both batteries to obtain the duration times given above.
Memory (factory default):	• 128 MB SDRAM • 128 MB Compact Flash (upgradable to 1 GB) - factory programmed

MVP-8400i Specifications (FG5965-04) (Cont.)	
Weight:	1.85 lbs (0.84 kg) • with 1 battery: 2.25 lbs (1.02 kg) • with 2 batteries: 2.65 lbs (1.20 kg)
MVP-8400i LCD Specifications:	• Aspect ratio: 4 x 3 • Brightness (luminance): 180 cd/m^2 • Channel transparency: 8-bit Alpha blending • Contrast ratio: 350:1 • Display colors: 256K colors (18-bit color depth) • Dot/pixel pitch: 0.21 mm • Panel type: TFT Color Active-Matrix • Screen resolution: 800 x 600 pixels (HV) @ 60 Hz frame frequency • Viewing angles (vertical): + 60° / - 40° (from center)
Active Screen Area:	• 6.71” x 5.03” (17.04cm x 12.78cm)
External Components:	
Docking station interface connector:	Metallic strip connector located on the bottom panel provides communication and power between the panel and the optional docking stations.
LEDs:	Two sets of NetLinx programmable LEDs (supporting On, Off, and Blink). Default blink patterns: - Stylus LED: Blink = *Batteries charging*, On = *Batteries charged*. - Front panel LED: Blink = *Panel booting,* On = *Panel operating properly.*
Mini-USB connector:	5-pin mini-USB connector for programming, firmware update, and file transfer.
Power connector:	• 2.1mm barrel-style power jack, for use with the included PS4.4 power supply.
Stylus slot:	• Illuminated slot where the included stylus is stored, located on the left side of the MVP.
External Buttons:	• Nine programmable pushbuttons (four located on the left of the LCD and five located on the right in a joystick configuration).
Internal Components:	
Wireless Interface card:	Provides 802.11 (CF Type I) wireless connectivity between the panel and a Wireless Access Point (such as the NXA-WAP200G).
IR Emitters:	Transmit IR over 20 feet (6.10 m).
Internal speaker:	Single 2 watt speaker.
Internal microphone	For use with the intercom feature
Battery compartment:	Houses up to 2 MVP-BP Power Packs.
Button Assignments:	Button assignments can only be adjusted in TPD4 and not on the panels. • Button channel range: 1 - 4000 button push and feedback (per address port) • Button variable text range: 1 - 4000 (per address port) • Button states range: 1 - 256 (General Button; 1 = Off State, 2 = On State) • Level range: 1 - 600 (default level value 0-255, can be set up to 1-65535) • Address port range: 1 - 100
Operating / Storage Environment:	• Operating Temperature: 0° C (32° F) to 40° C (104° F) • Operating Humidity: 20% - 85% RH • Storage Temperature: -20° C (-4° F) to 60° C (140° F) • Storage Humidity: 5% - 85% RH
Certifications:	• FCC Part 15 Class B and CE • IEC60950

MVP-8400i Specifications (FG5965-04) (Cont.)	
Included Accessories:	• MVP-BP Power Pack (**FG5965-20**): 2 included • 80211xCF Wireless Interface Compact Flash card (Type 1) - pre-installed • PS4.4 Power Supply (**FG423-44**) • Stylus
Other AMX Equipment:	• CB-MVPWDS Rough-In Box (**FG037-10**) • CC-USB (Type A) to Mini-B 5-Wire programming cable (**FG10-5965**) • MVP-BP Power Pack (additional/spare) (**FG5965-20**) • MVP-KS Kickstand (**FG5965-12**) • MVP-STYLUS three pack (**FG5965-30**) • MVP-TDS Table Top Docking Station (**FG5965-10**) • MVP-WDS Wall/Flush Mount Docking Station: Black (**FG5965-11**) / Silver (**FG5965-21**) • MVP-WDS-SK Silver Conversion Kit for MVP-WDS (**FG5965-22**) • NXA-WC80211GCF 802.11g Wireless Compact Flash Card Upgrade Kit (**FG2255-07**) • Upgrade Compact Flash (factory programmed with firmware): NXA-84ICF256M, 256 MB COMPACT FLASH CARD (**FG2116-70**) NXA-84ICF512M, 512 MB COMPACT FLASH CARD (**FG2116-71**) NXA-84ICF1G, 1 GB COMPACT FLASH CARD (**FG2116-72**)

MVP-BP Power Pack

Overview

The MVP-BP Power Pack (**FG5965-20**) is a rechargeable Lithium-Ion battery used to provide power to the MVP touch panels. Two MVP-BPs are included with each MVP-8400i touch panel.

FIG. 3 MVP-BP Power Pack

MVP-BPs can be charged with either a Table Top Docking Station (MVP-TDS), Wall/Flush Mount Docking Station (MVP-WDS), or the MVP panel itself. Extra MVP-BP Power Packs can be purchased separately.

MVP-BP Specifications

MVP-BP Specifications	
Dimensions (HWD):	0.48" x 1.52" x 8.65" (1.23 cm x 3.86 cm x 21.97 cm)
Power (Voltage):	7.2 Volts (nominal)
Weight:	0.40 lbs (0.18 kg)
Charge Capacity:	3600mAh
Operating/Storage Environments:	• Operating Temperature: 0° C (32° F) to 40° C (104° F) • Operating Humidity: 20% - 85% RH • Storage Temperature: -20° C (-4° F) to 60° C (140° F) • Storage Humidity: 5% - 85% RH

Installing MVP-BP Batteries

1. Disconnect any cables, and place the MVP face down to expose the battery compartment.
2. Press down on the traction grooves to slide the battery compartment cover (away from the metal plate), to open the battery compartment.
3. Insert the MVP-BP(s) so that the connector makes contact with the battery pins at the end of the battery slot as shown in FIG. 4.

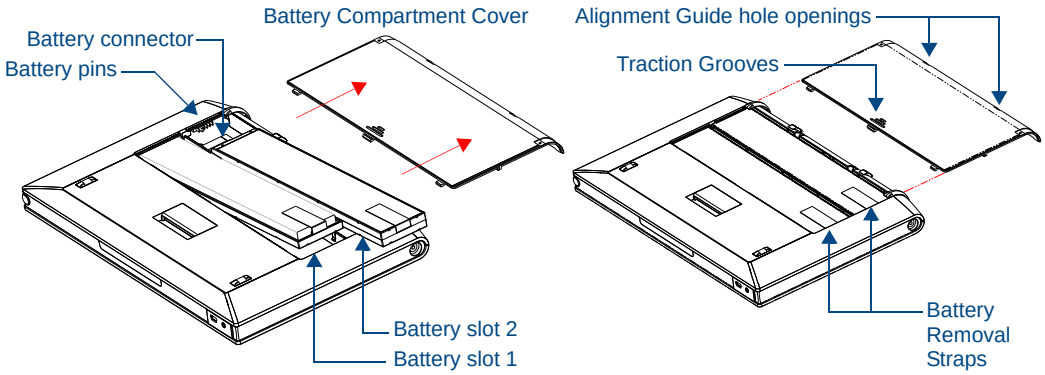


FIG. 4 Installing MVP-BP batteries into the MVP battery slots

NOTE

If you are only using one battery, use Battery Slot #1.

4. To replace the battery compartment cover, use the alignment guide holes to align the cover with the edges of the battery compartment, and slide it back into place until it snaps shut.

NXA-CFSP Compact Flash

Overview

Every MVP panel is shipped with a 128 MB Compact Flash card.

Compact Flash Card - Security

All security user names and passwords (for the docking station) are stored in the Compact Flash card. After installing the Compact Flash card upgrade, all security user names and passwords need to be re-entered to enable security. For this reason, it is recommended that you upgrade the card prior to setting up the security information for the docking station.

The NXA-CFSP Compact Flash card is factory programmed with panel firmware and can be upgraded up to 1GB:

Optional Compact Flash Upgrades	
NXA-84ICF256M, 256 MB COMPACT FLASH CARD	(**FG2116-70**)
NXA-84ICF512M, 512 MB COMPACT FLASH CARD	(**FG2116-71**)
NXA-84ICF1G, 1 GB COMPACT FLASH CARD	(**FG2116-72**)

Installing the NXA-CFSP Compact Flash Card

NOTE

Batteries should be removed prior to upgrading the Compact Flash card.

Accessing the MVP's Internal Components

1. Remove all connectors, remove power and remove batteries.
2. Remove the two housing screws (FIG. 5).

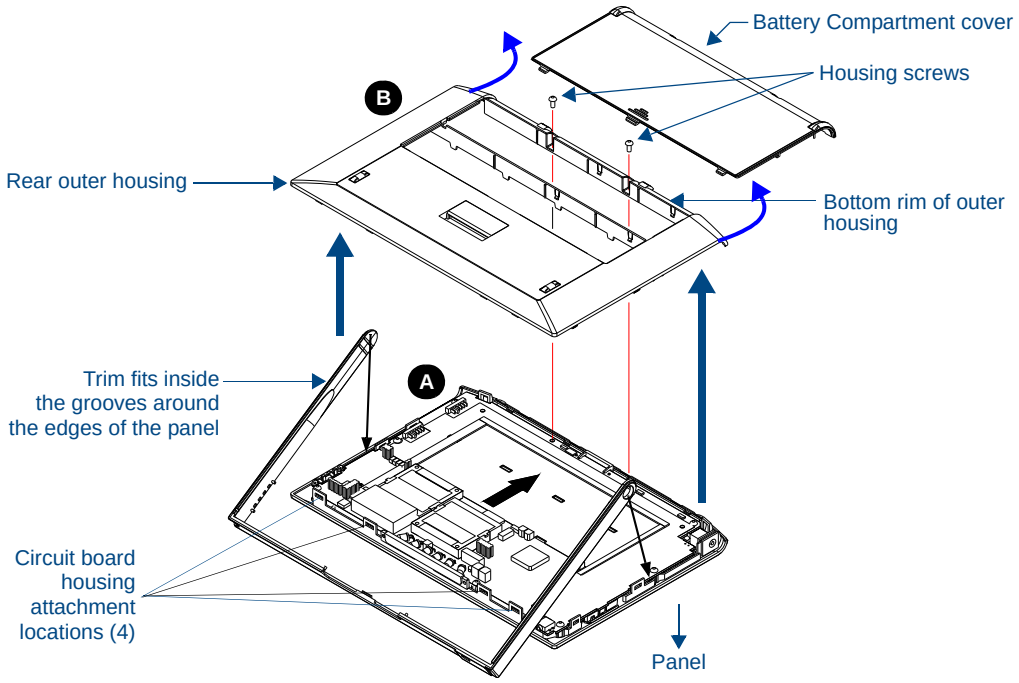


FIG. 5 Removing the MVP enclosure (housing)

3. Grasp the bottom rim of the rear housing just above the MVP interface connector, and carefully pull the bottom rim away from the IR Emitter and up, to expose the internal components.
4. Remove the trim from the top rim of the circuit board (FIG. 5).

Removing the Installed Card

1. Discharge any static electricity from your body by touching a grounded metal object and then locate the card slot on the main circuit board (FIG. 6).
2. Place the circuit board on a flat level surface so that the IR Emitters are pointing away from you (FIG. 6).
3. Insert the tip of a grounded flat-head screwdriver into one of the card removal grooves (located on either side of the existing card), and gently pry it out of the slot (FIG. 7). Repeat this process on the opposite card removal groove. *This alternating action causes the card to "wiggle" away from the on-board connector pins.*
4. Slip your finger into the gap between the card and the circuit board and firmly grab the card by its sides, then carefully pull it up and out of the slot. An angular removal of the card is required because one of the housing's latch attachments blocks the slot opening.

NOTE

use care when pulling up on the card.

Installing the Compact Flash Upgrade Card

1. Discharge any static electricity from your body by touching a grounded metal object and then locate the memory card slot on the main board (**A** in FIG. 6).

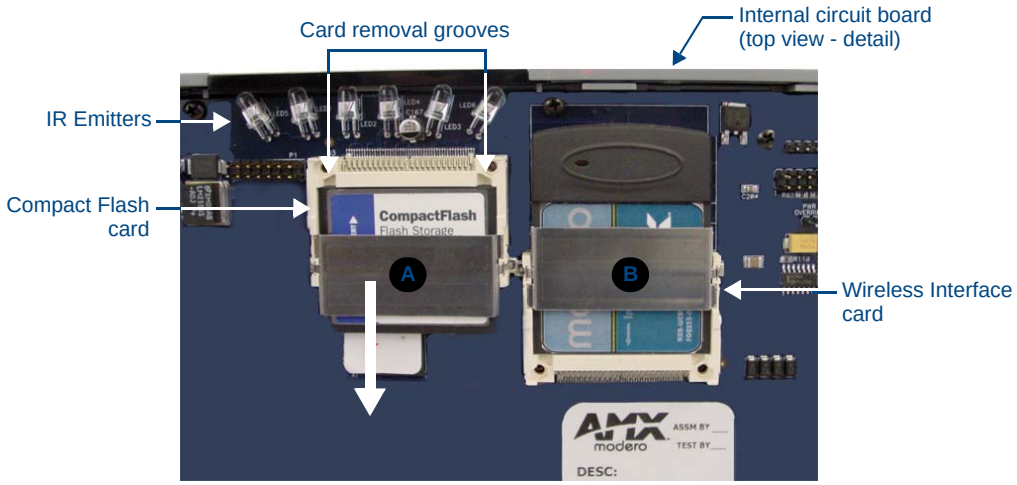


FIG. 6 Location and orientation of the Compact Flash cards (both MVP panels)

2. Place the circuit board on a flat level surface so that the IR Emitters are pointing away from you (FIG. 6).
3. Insert the tip of a grounded flat-head screwdriver into one of the card removal grooves (located on either side of the existing Compact Flash card), and gently pry it out of the slot (FIG. 7). Repeat this process on the opposite card removal groove. *This alternating action causes the pre-existing card to "wiggle" away from the on-board connector pins.*
4. Slip your finger into the opening (between the connector pins and the card resulting from step 3) and push the card out.
5. Finish the process by firmly gripping the exposed sides of the card and pulling it out (FIG. 7). **USE CARE WHEN HANDLING THE CARD.**

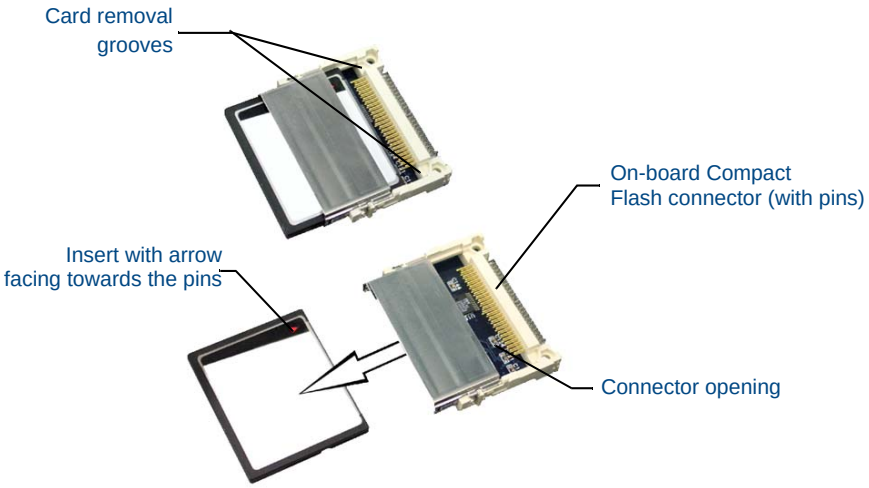

Card removal grooves
On-board Compact Flash connector (with pins)
Insert with arrow facing towards the pins
Connector opening

FIG. 7 Removing/installing a Compact Flash Memory card

6. Insert the new card firmly into the slot opening connector (FIG. 7) until the contact pins are completely inside the card and securely attached to the pin sockets.

NOTE

Any new Compact Flash card upgrade is detected by the panel only after the unit cycles power.

Panel Calibration

This section outlines the steps for calibrating the touch panel. *It is recommended that you calibrate the panel both before its initial use and after completing a firmware download.*

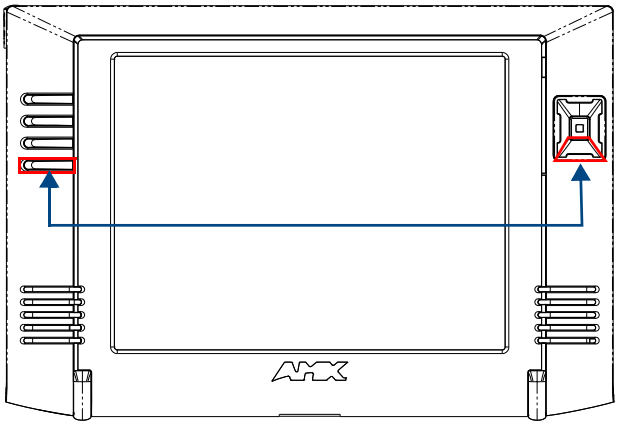
NOTE

If it has not already been removed, peel the protective plastic film from the LCD. If the protective plastic film on the LCD is not removed, the panel may not respond properly to touch points on the LCD nor allow proper screen calibration.

Modero panels are factory setup with specific demo touch panel pages. The first splash screen that appears indicates the panel is receiving power, beginning to load firmware, and preparing to display the default touch panel pages. When the panel is ready, the AMX Splash Screen is replaced by the Initial Panel Page.

Calibrating the MVP Panels

1. Press and hold the two lower external pushbuttons on both sides of the MVP (FIG. 8) for **6 seconds** to bypass the *Setup* page and access the *Calibrate* page (FIG. 9).

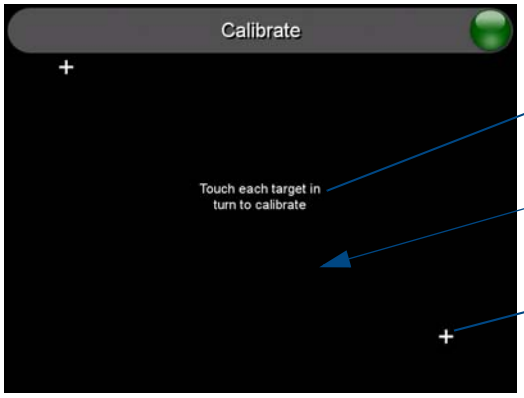


3 second press/hold of both buttons:
Opens the Setup page

6 second press/hold of both buttons:
Opens the Calibrate page

FIG. 8 Location of Setup Access buttons

2. Using the included stylus, press the crosshairs (on the *Calibrate* page) to set the calibration points on the LCD (FIG. 9).



The request to touch the crosshairs is the first on-screen message

Calibration successful is the second on-screen message that appears after the calibration process is completed

On-screen crosshairs used for calibration of the touch device

FIG. 9 Calibrate Page

3. After the "***Calibration Successful.***" message appears, press anywhere on the screen to continue and return to the *Setup* page.

NOTE

If the calibration was improperly set and you cannot return to the Calibration page (through the panel's firmware); *you can then access this firmware page via G4 WebControl where you can navigate to the Protected Setup page and press the Calibrate button through your VNC window.*
This action causes the panel to go to the Calibrate page seen above, where you can physically recalibrate the actual touch panel again using the above procedures.

Testing your Calibration

1. Press the Calibrate button on the to enter the *Calibrate* page (FIG. 10).

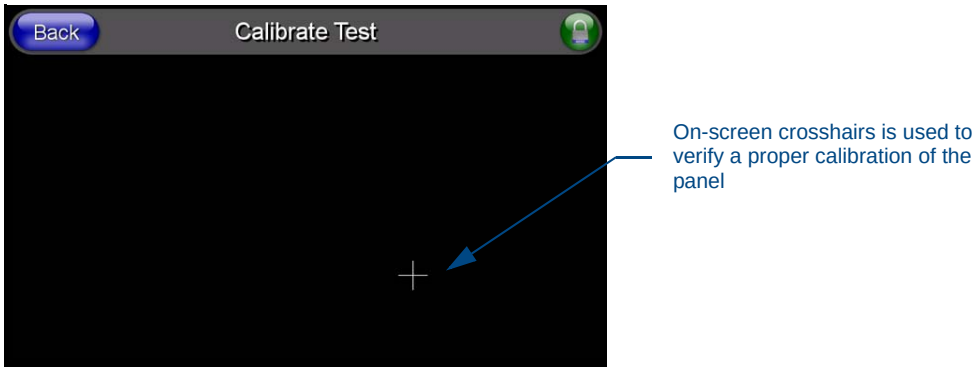


FIG. 10 Calibrate page

2. Press anywhere on this page to confirm the on-screen crosshairs match your touch points.
3. If the crosshairs do not appear directly below your LCD touch points, press the **Back** button and recalibrate the panel using the above steps.
4. Exit the *Calibration* page by pressing the **Back** button to return to the *Protected Setup* page.

If Calibration Is Not Working

Cycling power to the panel should provide a baseline calibration for the particular touch panel. After restarting, re-calibrate the panel.

Configuring Communications

Communication between the MVP and the Master consists of using either Wireless Ethernet (DHCP, Static IP) or USB. References to Ethernet in this manual focus on the use of Wireless Ethernet via the MVP's WiFi Card.

WARNING

Before commencing, verify you are using the latest NetLinx Master and Modero panel-specific firmware. Verify you are using the latest versions of AMX's NetLinx Studio and TPDesign4 programs.

NOTE

USB input devices must be plugged into the USB connectors on the docking stations before the units are powered-up.

Modero Setup and System Settings

AMX Modero panels feature on-board Setup pages. Use the options in the Setup pages to access panel information and make various configuration changes.

Accessing the Setup and Protected Setup Pages

1. Press down and hold both the bottom, left pushbutton and down on the directional pad simultaneously for 3-5 seconds. This opens the Setup page.

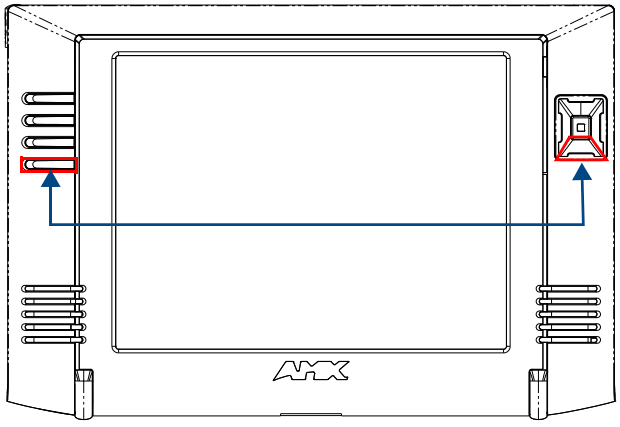

Setup Page Access buttons:
Press and hold simultaneously for
3-5 seconds to access the Setup pages
Press and hold for 6 seconds
to access the Calibration page.

FIG. 11 Setup Page Access buttons

2. Press the Protected Setup button. This invokes a keypad for entry of the password to allow access to the Protected Setup page. Enter **1988** (the default password), and press **Done** to proceed.

Setting the Panel's Device Number

In the *Protected Setup* page:

1. Press the *Device Number* field to open the Device Number keypad (FIG. 12).

   Enter a unique Device Number assignment for the panel, and press **Done** to return to the *Protected Setup* page. The Device Number range is 1 - 32000, the default is **10001**.

2. Press **Reboot** to reboot the panel, and apply the new Device Number.

Wireless Settings Page - Wireless Access Overview

Hot Swapping

Hot swapping is not an issue on these panels, as the card is installed within the unit and cannot be removed without first removing the housing.

In the case of DHCP, a DHCP server must be accessible before the fields are populated.

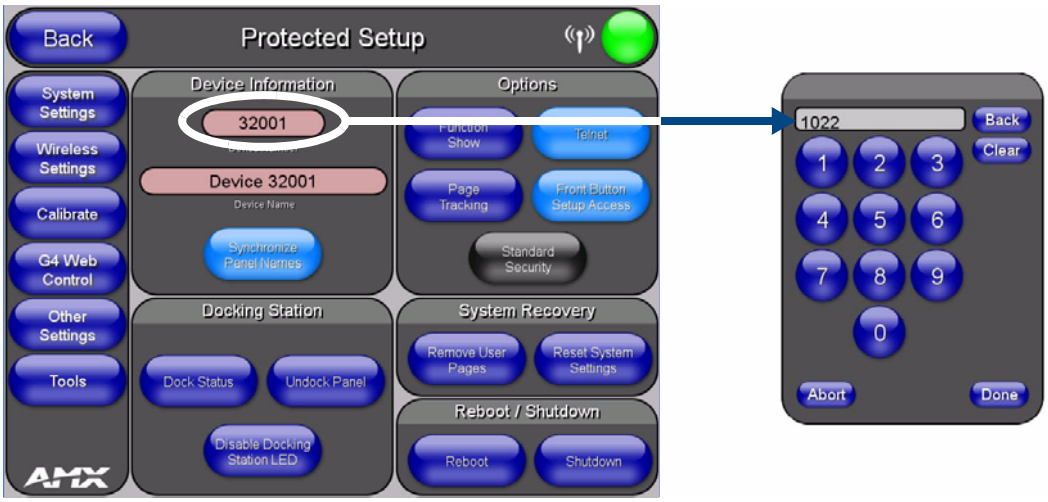


FIG. 12 Protected Setup page

NOTE

If the SSID (Network Name) and WEP fields have not previously been configured, the Wireless Settings page will not work until the panel is rebooted.

Before selecting **Ethernet** as the Master Connection Type you must setup the parameters of the wireless card. **The Wireless Access Point communication parameters must match those of the pre-installed wireless CF card inside the MVP.**

The MVP touch panels allow users to connect to a wireless network through their use of the pre-installed AMX 802.11g wireless interface card to communicate with a Wireless Access Point (WAP) such as the NXA-WAP200G). The WAP communication parameters must match those of the pre-installed wireless interface card installed within the panel. This internal card transmits data wirelessly using the 802.11x signals at 2.4 GHz. For a more detailed explanation of the new security and encryption technology, refer to the section of the document entitled: *Appendix B - Wireless Technology* section on page 163.

For more information on utilizing the AMX Certificate Upload Utility in conjunction with the EAP security, refer to the section of the document entitled: *Appendix B - Wireless Technology* section on page 163.

Configuring a Wireless Network Access

When working with a wireless card, the first step is to configure wireless communication parameters within the Wireless Settings page. This page only configures the card to communicate to a target WAP (such as the NXA-WAP200G), **it is still necessary to tell the panel which Master it should be communicating with**. This "pointing to a Master" is done via the System Settings page where you configure the IP Address, System Number and Username/Password information assigned to the target Master.

Step 1: Configure the Panel's Wireless IP Settings

The first step to successfully setting up your internal wireless card is to configure the IP Settings section on the Wireless Settings page. The section configures the communication parameters from the MVP panel to the web.

Wireless communication using a DHCP Address

In the *Protected Setup* page:

1. Select **Wireless Settings**. Wireless communication is set within the *IP Settings* section of this page (FIG. 13).
2. Toggle the *DHCP/Static* field (from the IP Settings section) until the choice cycles to *DHCP*. This action causes all fields in the IP Settings section (other than Host Name) to be greyed-out.

   NOTE

   DHCP will register the unique MAC Address (factory assigned) on the panel and once the communication setup process is complete, assign IP Address, Subnet Mask, and Gateway values from the DHCP Server.

3. Press the optional *Host Name* field to open a Keyboard and enter the Host Name information, if necessary.

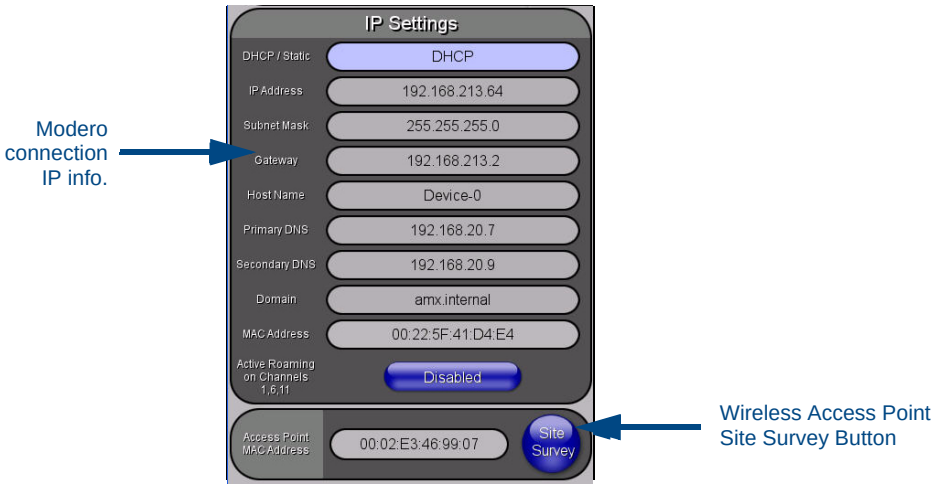


FIG. 13 Wireless Settings page (IP Settings section)

4. Press **Done** after you are finished assigning the alpha-numeric string of the host name.
5. The remaining greyed-out fields in the *IP Settings* section cannot be altered manually. Once the panel is rebooted, these values are obtained by the unit and displayed in the *DNS* fields after power-up.

NOTE

This information can be found in either the Workspace - System name > Define Device section of your code (that defines the properties for your panel), or in the Device Addressing/Network Addresses section of the Tools > NetLinx Diagnostics dialog.

6. Setup the security and communication parameters between the wireless card and the target WAP by configuring the *Wireless Settings* section on this page. Refer to *Step 2: Configure the Card's Wireless Security Settings* section on page 19 for detailed procedures to setup either a secure or unsecure connection.

Wireless communication using a Static IP Address

In the *Protected Setup* page:

1. Press the **Wireless Settings** button (located on the upper-left) to open the *Wireless Settings* page. Wireless communication is set within the **IP Settings** section of this page (FIG. 13).

NOTE

Check with your System Administrator for a pre-reserved Static IP Address assigned to the panel. This address must be obtained before Static assignment of the panel continues.

2. Toggle the *DHCP/Static* field (***from the IP Settings section***) until the choice cycles to **Static**.
   The IP Address, Subnet Mask, and Gateway fields then become user-editable (red).
3. Press the *IP Address* field to open a Keyboard and enter the Static IP Address (*provided by your System Administrator*).
4. Press **Done** after you are finished entering the IP information.
5. Repeat the same process for the *Subnet Mask* and *Gateway* fields.
6. Press the optional *Host Name* field to open the Keyboard and enter the Host Name information.
7. Press **Done** after you are finished assigning the alpha-numeric string of the host name.
8. Press the Primary DNS field to open a Keyboard, enter the Primary DNS Address (provided by your System Administrator) and press **Done** when compete. Repeat this process for the Secondary DNS field.
9. Press the Domain field to open a Keyboard, enter the resolvable domain Address (this is provided by your System Administrator and equates to a unique Internet name for the panel), and press **Done** when complete.
10. Setup the security and communication parameters between the wireless card and the target WAP by configuring the Wireless Settings section on this page. Refer to the following section for detailed procedures to setup either a secure or unsecure connection.

Simple versus Enterprise Configuration

The Information/Configuration section of the *Wireless Settings* page includes two options for security, depending upon the intended network. The **Simple** setting is intended for small networks, such as with residential or small office applications. The **Enterprise** setting is intended for larger networks, with higher demands for security.

To select configuration for a *Simple* network:

1. From the *Protected Settings* page, select the **Wireless Settings** button on the upper-left to open the *Wireless Settings* page (FIG. 14).

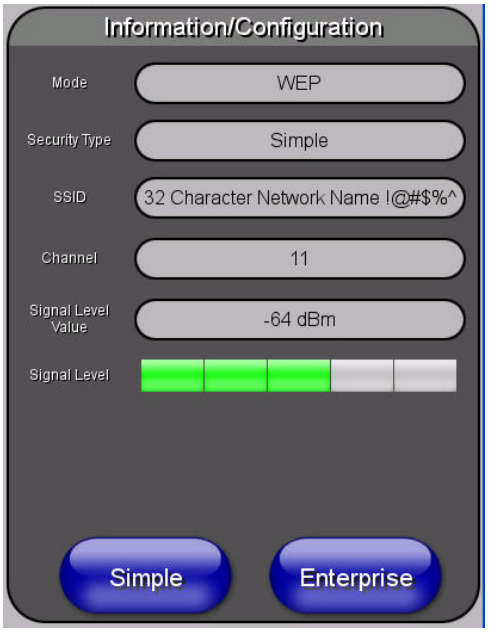


FIG. 14 Information/Configuration section with Simple and Enterprise buttons

2. In the lower-right corner of the *Wireless Settings* page, press the **Simple** button to open the *Wireless Security: Simple Mode* window (FIG. 15).

FIG. 15 Wireless Security: Simple Mode window

3. Select between the Security Types: Open, WEP, and WPA-PSK.
   - When selecting *Open* as a Security Type, only the *SSID* field is enabled. Press the *SSID* field to open the *Network Name (SSID)* keyboard, enter the appropriate Network Name, and press **Done** when finished.

- When selecting *WEP* as a Security Type, the button to the right of the Security Type may be toggled between 64 and 128. While the *Password* and *Current Key* fields are greyed out, the WEP keys are enabled: press each one to open the appropriate WEP Key keyboard and enter a WEP key, if necessary, and press **Done** to close the keyboard. Press the *Default Key* field to select between WEP Keys 1 through 4, and press the *Authentication* field to select between Open and Shared.
- When selecting *WPA-PSK* as a Security Type, only the *SSID* and *Password* fields are enabled. Press each to open the appropriate keyboard and enter a new SSID or password if necessary.

4. When finished, press the **Save** button to save any changes and return to the *Wireless Settings* page. Press **Cancel** to return to the *Wireless Settings* page without saving any changes.

To select configuration for an Enterprise network:

1. In the lower-right corner of the *Wireless Settings* page, press the **Enterprise** button to open the *Wireless Security: Enterprise Mode* window (FIG. 16).

FIG. 16 Wireless Security: Enterprise Mode window

2. Select between the Security Types: EAP-PEAP, EAP-TTLS, EAP-TLS, EAP-LEAP, and EAP-FAST.
   - When Selecting *EAP-PEAP* as a Security Type, press the *SSID*, *Identity*, *Password*, or *Certificate Authority* fields to open the appropriate keyboards, if necessary. Press the *PEAP Version* field to select between PEAPv0, PEAPv1, and PEAPv1 w/ peaplabel=1. Press the *Inner Auth Type* field to select between GTC, OTP, MD5, and MSCHAPv2.
   - When selecting *EAP-TTLS* as a Security Type, press the *SSID*, *Identity*, *Anon. Identity*, *Password*, or *Certificate Authority* fields to open the appropriate keyboards, if necessary. Press the *Inner Auth Type* field to select between MSCHAPv2, MSCHAP, PAP, CHAP, EAP-MSCHAPv2, EAP-GTC, EAP-OTP, and EAP-MD5.
   - When selecting *EAP-TLS* as a Security Type, press the *SSID*, *Identity*, *Certificate Authority*, *Client Certificate*, *Private Key*, or *Private Key Password* fields to open the appropriate keyboards, if necessary. All other fields are greyed-out.
   - When selecting *EAP-LEAP* as a Security Type, press the *SSID*, *Identity*, or *Password* fields to open the appropriate keyboards, if necessary. All other fields are greyed-out.
   - When selecting *EAP-FAST* as a Security Type, press the *SSID*, *Identity*, *Anon. Identity*, or *Password* fields to open the appropriate keyboards, if necessary. Press the *Auto PAC Provisioning* field to select between *Enabled* or *Disabled*: when this field is Enabled, the *PAC File Location* field is greyed out, but the field may be pressed and the *PAC File Location* keyboard opened if it is Disabled. The *Auto Key Renewal* field is greyed out when Auto PAC Provisioning is Disabled; if it is Enabled, select between NEVER, 1 Day, 3 Days, 7 Days, 14 Days, or 30 Days.
3. When finished, press the **Save** button to save all changes and return to the *Wireless Settings* page. Press the **Cancel** button to return to the *Wireless Settings* page without saving any changes.

Using the Site Survey tool

This tool allows a user to "sniff-out" all transmitting Wireless Access Points within the detection range of the internal NXA-WC80211GCF. Once pressed, the panel displays the *Site Survey* page, which contains categories such as:.

- **Network Name** (SSID) - Wireless Access Point names
- **Channel** (RF) - Channel currently being used by the WAP (*Wireless Access Point*).
- **Security Type** (if detectable - such as **WEP**, **OPEN** and **UNKNOWN**) - security protocol enabled on the WAP.
- **Signal** - The signal strength in dBm. This category may be displayed in ascending or descending order by pressing the arrow at the top of the list.
- **MAC Address** - Unique identification of the transmitting Access Point.

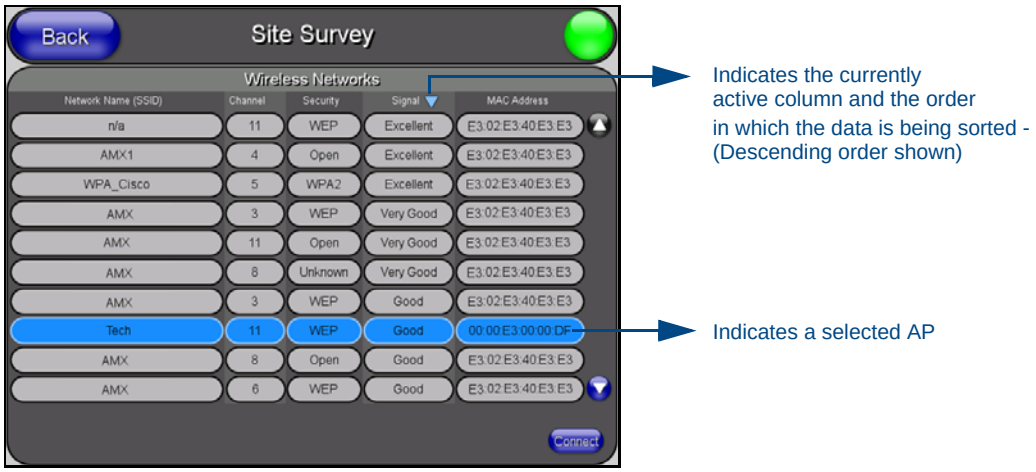

Back
Site Survey
Wireless Networks
Network Name (SSID)
Channel
Security
Signal
MAC Address
n/a 11 WEP Excellent E3:02:E3:40:E3:E3
AMX1 4 Open Excellent E3:02:E3:40:E3:E3
WPA_Cisco 5 WPA2 Excellent E3:02:E3:40:E3:E3
AMX 3 WEP Very Good E3:02:E3:40:E3:E3
AMX 11 Open Very Good E3:02:E3:40:E3:E3
AMX 8 Unknown Very Good E3:02:E3:40:E3:E3
AMX 3 WEP Good E3:02:E3:40:E3:E3
Tech 11 WEP Good 00:00:E3:00:00:DF
AMX 8 Open Good E3:02:E3:40:E3:E3
AMX 6 WEP Good E3:02:E3:40:E3:E3
Connect
Indicates the currently active column and the order in which the data is being sorted - (Descending order shown)
Indicates a selected AP

FIG. 17 Wireless Site Survey page

In the *Protected Setup* page:

1. Press the **Wireless Settings** button (located on the upper-left corner) to open the *Wireless Settings* page.
2. Navigate to the Access Point MAC Address section at the bottom of this page and press the on-screen **Site Survey** button. This action launches the *Site Survey* page, which displays a listing of all detected WAPs in the communication range of the internal card.
   - The card scans its environment every four seconds and adds any new WAPs found to the list. Every scan cycle updates the signal strength field.
   - Access points are tracked by MAC Address.
     - If the WAP's SSID is set as a blank, then **N/A** is displayed within the *SSID* field.
     - If the WAP's SSID is hidden (*not broadcast*) it will not show up on the site survey screen but it can still be configured via the *SSID* field on the specified security mode screen.
     - If a WAP displayed in the list is not detected for 10 scans in a row, it is then removed from the screen. In this way, a user can walk around a building and see access points come and go as they move in and out of range.
3. Sort the information provided on this page by pressing on a column name and toggling the direction of the adjacent arrow.
   - **Up arrow** - indicates that the information is being sorted in a Ascending order.
     - **SSID** (A to Z), **Channel** (1 to 14), **Security** (Unknown to WEP), **Signal** (None to Excellent). The firmware considers the following to be the security order from least secure to most secure: Open, WEP, WPA, WPA2, and Unknown.
   - **Down arrow** - indicates that the information is being sorted in a Descending order.
     - **SSID** (Z to A), **Channel** (11 to 6), **Security** (WEP to Unknown), **Signal** (Excellent to None)

NOTE

If the panel detects more than 10 WAPs, the Up/Down arrows at the far right side of the page become active (blue) and allow the user to scroll through the list of entries.

4. Select a desired Access Point by touching the corresponding row. The up arrow and down arrow will be grayed out if there are ten or less access points detected. If there are more, then they will be enabled as appropriate so that the user can scroll through the list.

5. With the desired WAP selected and highlighted, click the **Connect** button to be directed to the selected security mode's Settings page, either *Simple* or *Enterprise*, with the *SSID* field filled in. You can then either **Cancel** the operation or fill in any necessary information fields and then click **Save**.
*If you select an Open, WEP, and WPA-PSK Access Point and then click **Connect**, you will be flipped to the corresponding Settings page. For any other security mode, if you click **Connect** you will only return to the previous page without any information being pre-filled out for you.*
   - In an Open security mode, when a target WAP is selected and the connect to, the SSID name of the selected WAP is saved for the open security mode.
   - In a Static WEP security mode, when a WEP Access Point is selected and then connected to, the user is then redirected back to the Static WEP security screen where the *SSID* field is already filled out and the user is only required to enter in the remaining WEP key settings.
   - A similar process occurs for WPA-PSK access points. For any other case, the firmware switches back to the previous page and security and connection parameters must be entered in as normal.

Step 2: Configure the Card's Wireless Security Settings

The second step to successfully setting up your wireless card is to configure the Wireless Settings section of the Wireless Settings page. This section configures both the communication and security parameters from the internal wireless card to the WAP. ***The procedures outlined within the following sections use an 802.11g card to configure a common security configuration to a target WAP.***

Refer to either the Wireless Settings Page section on page 57 *or the Appendix B - Wireless Technology* section on page 163 *for more information on the other security methods.*

Once you have set up the wireless card parameters, you must configure the communication parameters for the target Master; see *Step 3: Choose a Master Connection Mode* section on page 24.

Configuring the Modero's wireless card for unsecured access to a WAP200G

In the *Protected Setup* page:

1. Press the **Wireless Settings** button (located on the upper-left) to open the *Wireless Settings* page.

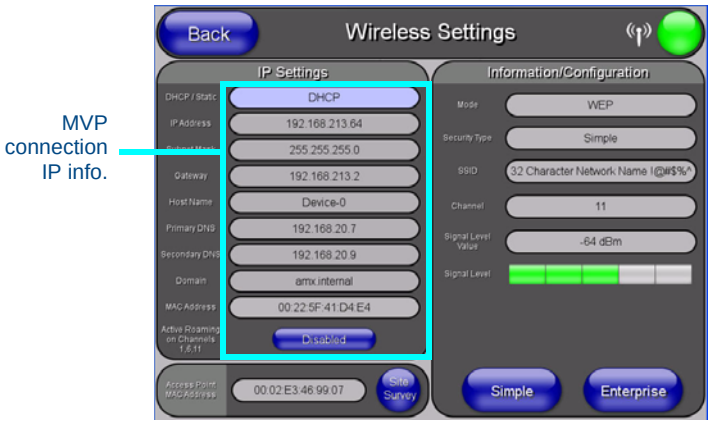


FIG. 18 Wireless Settings page (showing a sample unsecured configuration)

2. Enter the SSID information by either:
   - *Automatically* having it filled in by pressing the **Site Survey** button and from the *Site Survey* page, choosing an ***Open*** WAP from within the Site Survey page and then pressing the **Connec**t button.
   - *Manually* entering the SSID information into their appropriate fields by following steps 7 thru 9.

3. Press the **Simple** button at the bottom of the Wireless Settings page and select *Open* as the Security Type. An Open security method does not utilize any encryption methodology, but does require that an SSID (alpha-numeric) be entered. Using this method causes network packets to be sent out as unencrypted text.

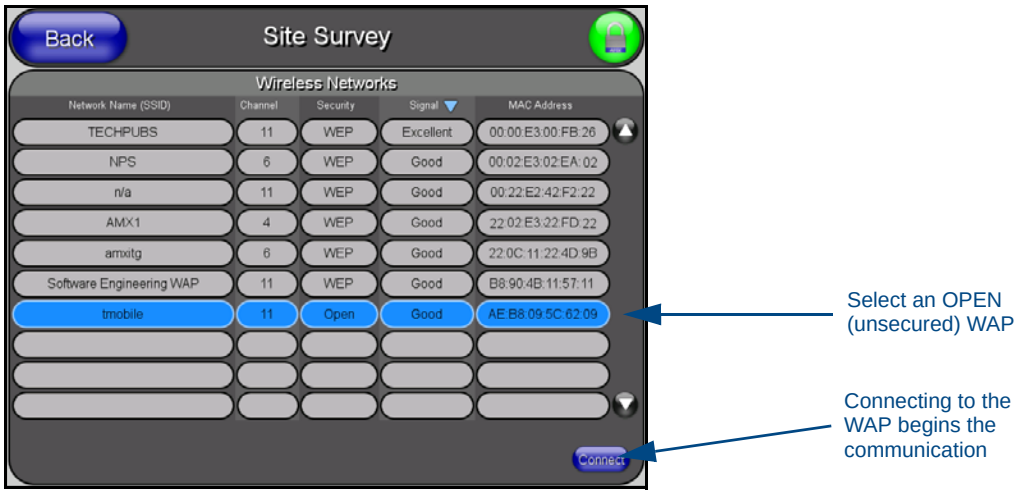


FIG. 19 Site Survey of available WAPS (Unsecured WAP shown selected)

4. Press the red *SSID* field to display the on-screen *Network Name (SSID)* keyboard.
5. In this keyboard, enter the SSID name used on your target Wireless Access Point (**case sensitive**).
   - The card should be given the SSID used by the target WAP. If this field is left blank, the unit will attempt to connect to the first available WAP. By default, all WAP200Gs use **AMX** as their assigned SSID value.
   - One of the most common problems associated with connection to a WAP arise because the SSID was not entered properly. You must maintain the same case when entering the SSID information. ABC is not the same as Abc.
6. Click **Done** when you've completed typing in the information.
7. From the Wireless Security: Simple Mode window, press the **Save** button to incorporate your new information into the panel and begin the communication process.
8. Verify the fields in the *IP Settings* section have been properly configured. Refer to *Step 1: Configure the Panel's Wireless IP Settings* section on page 14 for detailed information.
9. Press the **Back** button to return to the Protected Setup page and press the on-screen **Reboot** button to both save any changes and restart the panel. ***Remember that you will need to navigate to the System Settings page and configure the connection to a target Master.***
10. After the panel restarts, return to the *Wireless Settings* page's Information/Configuration section and verify the Signal Level Value and the Signal Level:
    - The Signal Level is displayed as a bar graph.

NOTE

The signal strength field should provide some descriptive text regarding the strength of the connection to a Wireless Access Point. If there is no signal or no IP Address displayed; configuration of your network could be required.

Configuring the Modero's wireless card for secured access to a WAP200G

After logging into the WAP200G, the default Status page appears within the web browser. These read-only values are "pulled" from some of the other user-configurable Configuration Utility pages. By default, wireless Modero panels are configured for unsecured communication to a Wireless Access Point. To properly setup both the WAP200G and panel for secure communication, you must first prepare the Modero panel and then use the information given to fill out the fields within the WAP's browser-based Basic Wireless Configuration page.

Since the code key generator on Modero panels use the same key generation formula, all panels will generate identical keys for the same Passphrase. The generators used on WAPs will not produce the same key as the Modero generator even if you use the same Passphrase. **For this reason, we recommend FIRST creating the Current Key on the Modero and then entering that information into the appropriate NXA-WAP200G fields**.

Automatically set SSID

In the *Protected Setup* page:

1. Select **Wireless Settings**.
2. Press the **Site Survey** button.
3. Select a **WEP** secured WAP from within the *Wireless Site Survey* page, and press the **Connect** button.

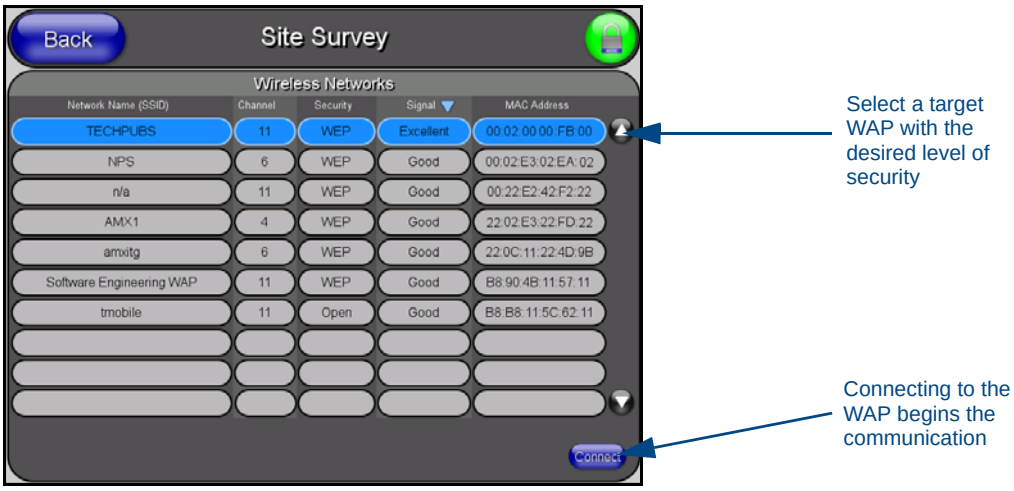


FIG. 20 Site Survey of available WAPs (Secured WAP shown selected)

4. Write down the SSID name, Current Key string value, and panel MAC Address information so you can later enter it into the appropriate WAP dialog fields in order to "sync-up" the secure connection. These values must be identically reproduced on the target WAP.

Manually set SSID

In the *Protected Setup* page:

1. Select **Wireless Settings**.
2. In the *IP Settings* section, press the *DHCP/Static* field until it reads "Static".

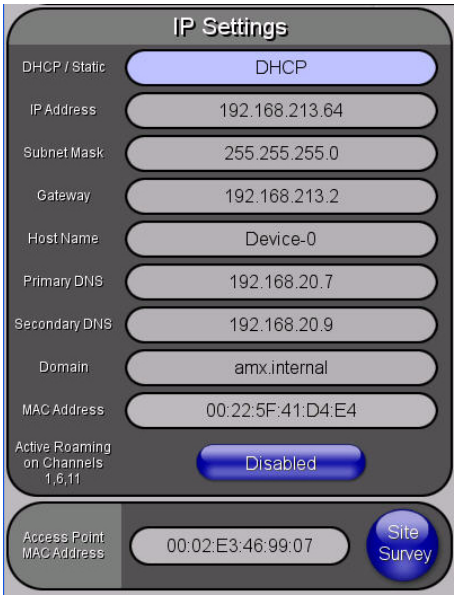


FIG. 21 Wireless Settings page

You must first take down the SSID name, Current Key string value, and panel MAC Address information so you can later enter it into the appropriate WAP dialog fields in order to "sync-up" the secure connection. These values must be identically reproduced on the target WAP.

3. Press the **Simple** button to open the *Wireless Security: Simple Mode* window (FIG. 22).

FIG. 22 Wireless Security: Simple Mode window

4. Press the *SSID* field and from the *Network Name (SSID)* keyboard, enter the SSID name you are using on your target Wireless Access Point (**case sensitive**). Press **Done** when finished.
   - The card should be given the SSID used by the target WAP. If this field is left blank, the unit will attempt to connect to the first available WAP. By default, all WAP200Gs use **AMX** as their assigned SSID value.
   - One of the most common problems associated with connection to a WAP arise because the SSID was not entered properly. You must maintain the same case when entering this information. ***ABC is not the same as Abc***.
   - The alpha-numeric string is by default **AMX** but can later be changed to any 32-character entry. *This string must be duplicated within the Network Name (SSID) field on the WAP.*
   - As an example, if you use **TECHPUBS** as your SSID, you must **match this word and the case** within both the *Network Name (SSID)* field on the touch panel's *Network Name SSID* field and on the WAP's *Basic Wireless Configuration* page.
5. Toggle the *Encryption* button (FIG. 22) until it reads either: **64** or **128** for Bit Key Size.
   The 64/128 selection reflects the bit-level of encryption security. This WEP encryption level must match the encryption level being used on the WAP.

WEP will not work unless the same Default Key is set on both the panel and the Wireless Access Point.
For example: if you have your Wireless Access Point set to default key 4 (which was 01:02:03:04:05), you must set the panel's key 4 to 01:02:03:04:05.

6. Toggle the *Default Key* field until the you've chosen a WEP Key value (**from 1- 4**) that matches what you'll be using on your target WAP200G. **This value MUST MATCH on both devices**.
   - **These WEP Key identifier values must match for both devices.**
   - **This series of hex digits (26 hex digits for a 128-bit encryption key) should be entered as the *Current Key* into both the WAP and onto other communicating Modero panels by using the WEP Key dialog (FIG. 23).**
7. Write down this Current Key string value for later entry into your WAP's *WEP Key* field (*typically entered without colons*) and into other communicating panel's *Current Key* field (FIG. 23).

FIG. 23 WEP Key # Keyboard

8. **If you are entering a Current Key generated either by your target WAP or another Modero panel**, within the *WEP Keys* section, touch the **Key #** button to launch the *WEP Key #* keyboard (FIG. 23), enter the characters and press **Done** when finished.
   - This Key value corresponds to the Default WEP Key number used on the Wireless Access Point and selected in the Default Key field described in the previous step.

NOTE

If your target Wireless Access Point does not support passphrase key generation and has previously been setup with a manually entered WEP KEY, you must manually enter that same WEP key on your panel.

9. The *Current Key* field is greyed-out and cannot be altered by the user. The *Authentication* field may be switched from Open to Shared.
10. When finished, press the **Save** button to save all changes and return to the *Wireless Settings* page. Press **Cancel** to return to the *Wireless Settings* page without saving any changes.
11. Verify the fields within the *IP Settings* section have been properly configured. Refer to *Step 1: Configure the Panel's Wireless IP Settings* section on page 14 for detailed information.
12. Press the **Back** button to navigate to the *Protected Setup* page and press the on-screen **Reboot** button to both save any changes and restart the panel. ***Remember that you will need to navigate to the System Settings page and configure the connection to a target Master.***
13. After the panel restarts, return to the Wireless Settings page to verify the Signal Level Value and Signal Level:

NOTE

The signal strength field provides some descriptive text regarding the strength of the connection to a Wireless Access Point. If the display contains no signal or no IP Address, configuration of your network could be required.

Refer to the NXA-WAP200G Instruction Manual for more detailed setup and configuration procedures.

Configuring multiple wireless Moderos to communicate to a target WAP200G

1. For each communicating touch panel, complete all of the steps outlined within the previous *Configuring the Modero's wireless card for secured access to a WAP200G* section on page 20.
2. Navigate back to the *Wireless Settings* page on each panel.
3. Verify that all communicating Modero panels are using the same **SSID**, **encryption level**, **Default Key #**, and an identical **Current Key value**.
   - As an example, all panels should be set to Default Key **#1** and be using **aa:bb:cc**... as the Current Key string value. This same Key value and Current Key string should be used on the target WAP.
4. Repeat steps 1 - 3 on each panel. **Using the same passphrase, generates the same key for all communicating Modero panels.**

Step 3: Choose a Master Connection Mode

The panel requires you establish the type of connection you want made between it and your master.

In the *Protected Setup* page:

1. Select *System Settings.*
2. Select *Type* to toggle between the Master Connection Types *USB* and *Ethernet*.
   - A USB connection is a direct connection from the panel's mini-USB port to a corresponding USB port on the PC (acting as a Virtual Master).
   - A Wireless Ethernet connection involves indirect communication from the panel to a Master via a wireless connection to the network.

WARNING

It is recommended that firmware KIT files only be transferred over a direct connection and only when the panel is connected to a power supply. If battery power or wireless connection fails during a firmware upgrade, the panel flash file system may become corrupted.

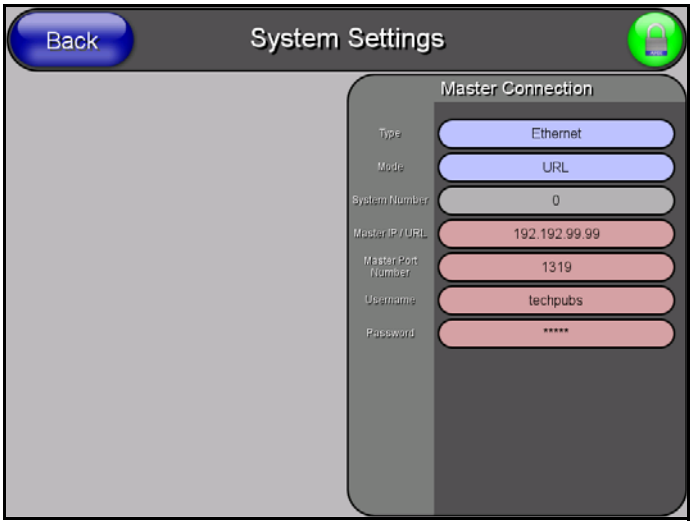


FIG. 24 System Settings page

USB

NetLinx Studio can be setup to run a Virtual Master where the PC acts as the Master by supplying its own IP Address for communication to the panel. For a PC to establish a USB connection with a Modero panel, it must have the AMX USBLAN driver installed.

NOTE

The AMX USBLAN driver is included with both NetLinx Studio2 and TPDesign4, and can also be downloaded as a stand-alone application from www.amx.com.

Prepare your PC for USB communication with the panel

If you haven't already done so, download and install the latest versions of NetLinx Studio2 and TPDesign4 (from www.amx.com), and restart your PC.

Configure the panel for USB communication

The first time the panel is connected to the PC it is detected as a new USB hardware device, and the correct (panel-specific) USBLAN driver must be associated to it manually. Each time thereafter, the panel is recognized as a unique USBLAN device, and the association to the driver is handled automatically.

1. Connect the PS4.4 power connector to the panel (or docking station if the panel is already installed) to supply power.
2. Press and hold the two lower external pushbuttons on either side of the panel simultaneously for 3 seconds to access the Setup page (see FIG. 11 on page 13).
3. In the *Protected Settings* page, select **System Settings** to open the *System Settings* page (FIG. 25).

4. Toggle the blue *Type* field (***from the Master Connection section***) until the choice cycles to **USB**.
   Refer to the *System Settings Page* section on page 55 for information about the fields on this page.

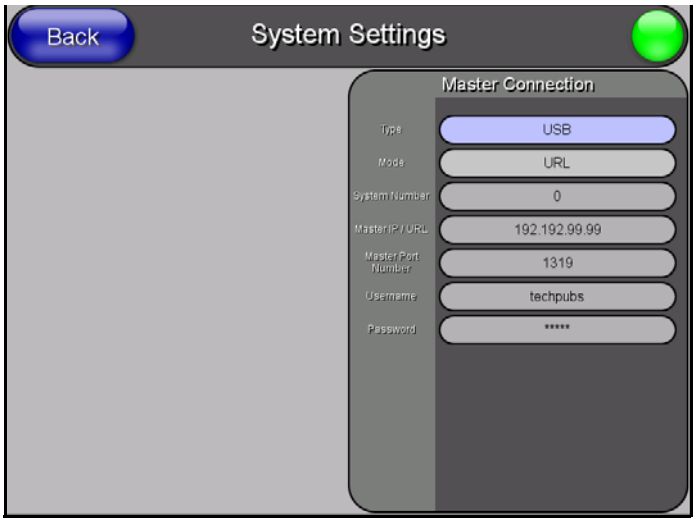


FIG. 25 System Settings page - USB Connection

5. Press the **Back** button to return to the Protected Setup page.
6. Press **Reboot** to save changes and restart the panel.
7. When the panel powers up and displays the first panel page, insert the mini-USB connector into the Program Port on the panel.
   It may take a minute for the panel to detect the new connection and send a signal to the PC (*indicated by a green System Connection icon*).
   The first time the panel is recognized by the PC as a new USB device, a USB driver installation popup window (FIG. 26) is displayed. This window notifies you that the panel has been detected as a USB device, and the appropriate USB driver is being installed to establish communication with the panel. It also indicates that the AMX USBLAN driver does not contain a Microsoft® digital signature.

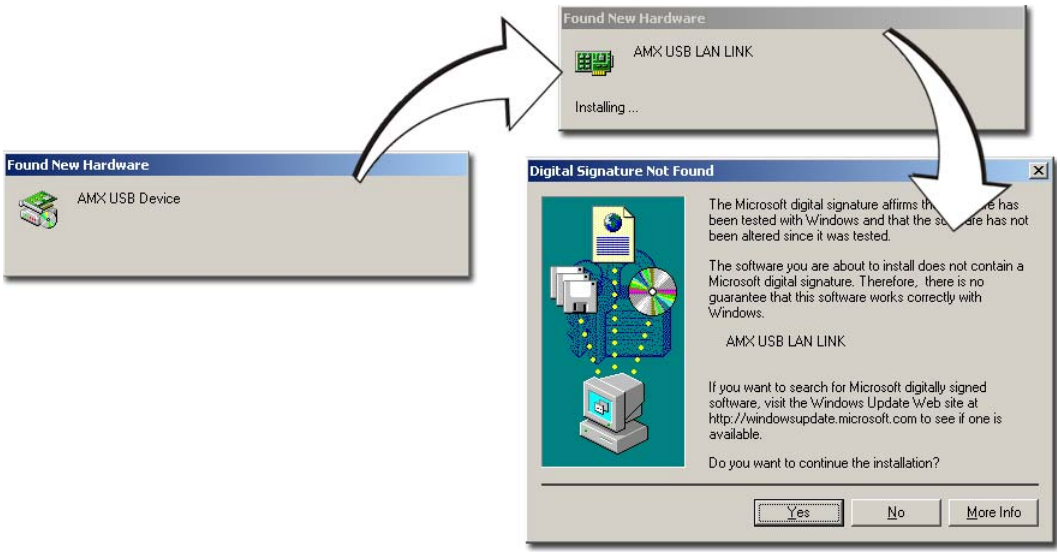

Found New Hardware
AMX USB Device
Found New Hardware
AMX USB LAN LINK
Installing ...
Digital Signature Not Found
The Microsoft digital signature affirms th
been tested with Windows and that the s
been altered since it was tested.
The software you are about to install does not contain a Microsoft digital signature. Therefore, there is no guarantee that this software works correctly with Windows.
AMX USB LAN LINK
If you want to search for Microsoft digitally signed software, visit the Windows Update Web site at http://windowsupdate.microsoft.com to see if one is available.
Do you want to continue the installation?
Yes
No
More Info

FIG. 26 USB driver installation popup window

8. Click **Yes** to proceed with the driver installation.
   Once the installation is complete, the panel and PC are ready to communicate via USB.
9. Navigate back to the *System Settings* page.

Configure a Virtual NetLinx Master using NetLinx Studio

A Virtual NetLinx Master (VNM) is used when the target panel is not connected to a physical NetLinx Master. In this situation, the PC takes on the functions of a Master via a Virtual NetLinx Master. This connection is made by either using the PC's Ethernet Address (via TCP/IP using a known PC's IP Address as the Master) or using a direct mini-USB connection to communicate directly to the panel.

Before beginning:

1. Verify the panel has been configured to communicate via USB within the System Settings page and that the USB driver has been properly configured. Refer to the previous section for more information.
2. In NetLinx Studio, select **Settings > Master Communication Settings**, from the Main menu to open the Master Communication Settings dialog (FIG. 27).

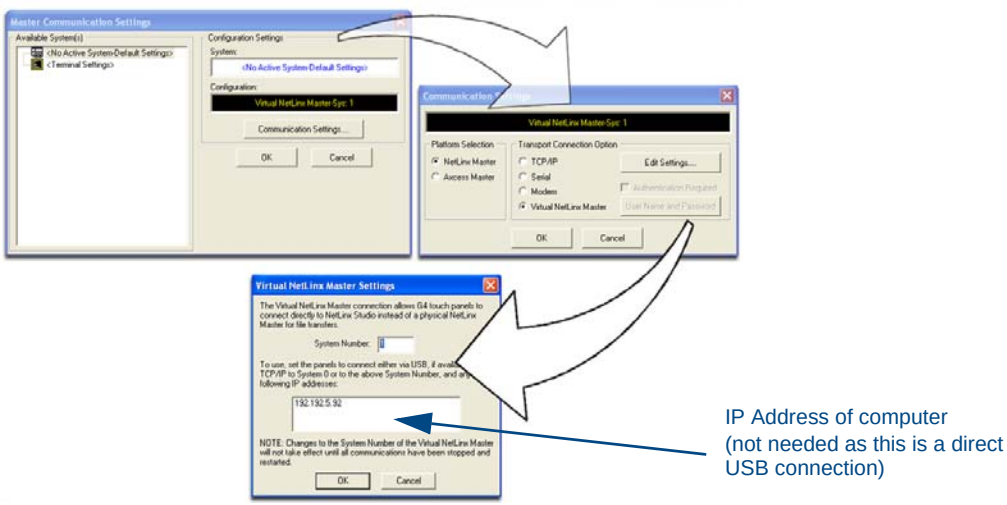


FIG. 27 Assigning Communication Settings for a Virtual Master

3. Click the **Communications Settings** button to open the *Communications Settings* dialog.
4. Click the **NetLinx Master** radio button (*from the Platform Selection section*).
5. Click the **Virtual Master** radio button (*from the Transport Connection Option section*).
6. Click the **Edit Settings** button to open the *Virtual NetLinx Master Settings* dialog (FIG. 27).
7. Enter the System number (default is **1**).
8. Click **OK** to close all open dialogs and save your settings.
9. Click the **OnLine Tree** tab in the Workspace window to view the devices on the Virtual System.
10. Right-click on *Empty Device Tree/System* and select **Refresh System** to re-populate the list.
    The panel will not appear as a device below the virtual system number (in the Online Tree tab) until both the system number (default = 1) is entered into the Master Connection section of the System Settings page and the panel is restarted.
    - The Connection status turns green after a few seconds to indicate an active USB connection to the PC (Virtual Master).
    - If the System Connection icon does not turn green, check the USP connection and communication settings and refresh the system.

Ethernet

1. When using *Ethernet*, press the listed *Mode* to toggle through the available connection modes:

Connection Modes		
Mode	Description	Procedures
Auto	The device connects to the first master that responds. This setting requires you set the System Number.	Setting the System Number: 1. Select the *System Number* to open the keypad. 2. Set your System Number select **Done**.
URL	The device connects to the specific IP of a master via a TCP connection. This setting requires you set the Master's IP.	Setting the Master IP: 1. Select the *Master IP* number to the keyboard. 2. Set your Master IP and select **Done**.
Listen	The device "listens" for the master to initiate contact. This setting requires you provide the master with the device's IP.	Confirm device IP is on the Master URL list. You can set the Host Name on the device and use it to locate the device on the master. Host Name is particularly useful in the DHCP scenario where the IP address can change.

2. Select the *Master Port Number* to open the keypad and change this value. The default setting for the port is *1319*.
3. Set your Master Port and select **Done**.

If you have enabled password security on your master you need to set the username and password within the device.

4. Select the blank field *Username* to open the keyboard.
5. Set your Username and select **Done**.
6. Select the blank field *Password* to open the keyboard.
7. Set your Password and select **Done**.
8. Press the **Back** button to return to the *Protected Setup* page.
9. Press the **Reboot** button to reboot device and confirm changes.

Master Connection to a Virtual Master via Ethernet

When configuring your panel to communicate with a Virtual Master (on your PC) via wireless Ethernet, the Master IP/URL field must be configured to match the IP Address of the PC and make sure to use the Virtual System value assigned to the Virtual Master within NetLinx Studio.

Before beginning:

1. Verify the panel has been configured to communicate with the Wireless Access Point and verify the signal strength quality bargraph is On.
2. Launch NetLinx Studio 2.x (default location is **Start > Programs > AMX Control Disc > NetLinx Studio 2 > NetLinx Studio 2**).
3. Select **Settings > Master Communication Settings**, from the Main menu to open the Master Communication Settings dialog (FIG. 28).
4. Click the **Communications Settings** button to open the *Communications Settings* dialog.
5. Click on the **NetLinx Master** radio button (*from the Platform Selection section*) to indicate that you are working as a NetLinx Master.
6. Click on the **Virtual Master** radio box (*from the Transport Connection Option section*) to indicate you are wanting to configure the PC to communicate with a panel. Everything else such as the Authentication is greyed-out because you are not going through the Master's UI.
7. Click the **Edit Settings** button (*on the Communications Settings dialog*) to open the Virtual NetLinx Master Settings dialog (FIG. 28).
8. From within this dialog enter the System number (**default is 1**) and note the IP Address of the target PC being used as the Virtual Master. This IP Address can also be obtained by following these procedures:
   - On your PC, click **Start > Run** to open the Run dialog.
   - Enter **cmd** into the Open field and click **OK** to open the command DOS prompt.

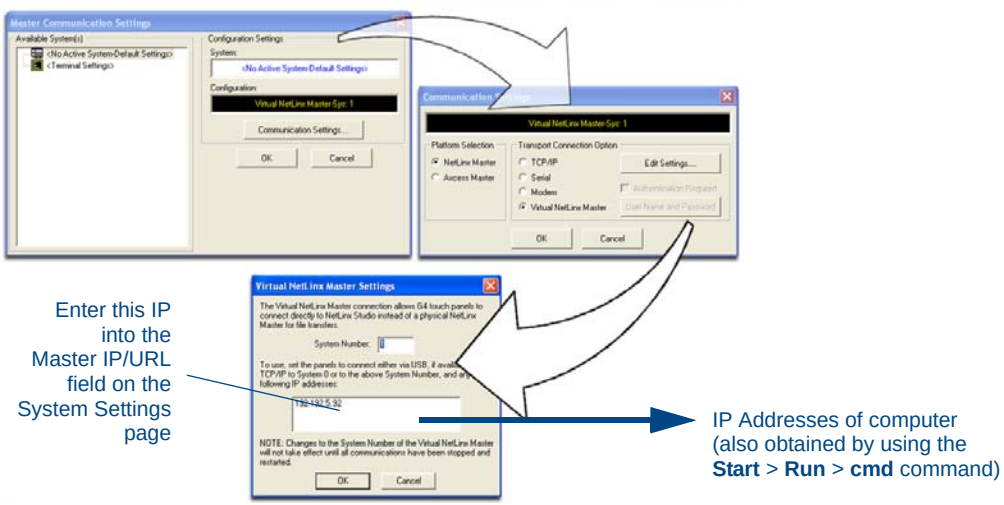

Enter this IP into the Master IP/URL field on the System Settings page
IP Addresses of computer (also obtained by using the Start > Run > cmd command)

FIG. 28 Assigning Communication Settings and TCP/IP Settings for a Virtual Master

- From the **C:\>** command line, enter **ipconfig** to display the IP Address of the PC. This information is entered into the *Master IP/URL* field on the panel.

9. Click **OK** three times to close the open dialogs, save your settings, and return to the main NetLinx Studio application.
10. Click the **OnLine Tree** tab in the Workspace window to view the devices on the Virtual System. *The default System value is **one***.
11. Right-click on the *Empty Device Tree/System* entry and select **Refresh System** to re-populate the list.
12. Connect the terminal end of the PS4.4 power cable to the 12 VDC power connector on the side of the stand-alone touch panel.
    - If the MVP is installed onto a docking station, feed power to the docked panel by connecting the appropriate power supply to the docking station.
13. After the panel powers-up, press and hold the two lower buttons on both sides of the display (**for 3 seconds**) to continue with the setup process and proceed to the Setup page.
14. Select **Protected Setup > System Settings** (located on the lower-left) to open the System Settings page (FIG. 29).

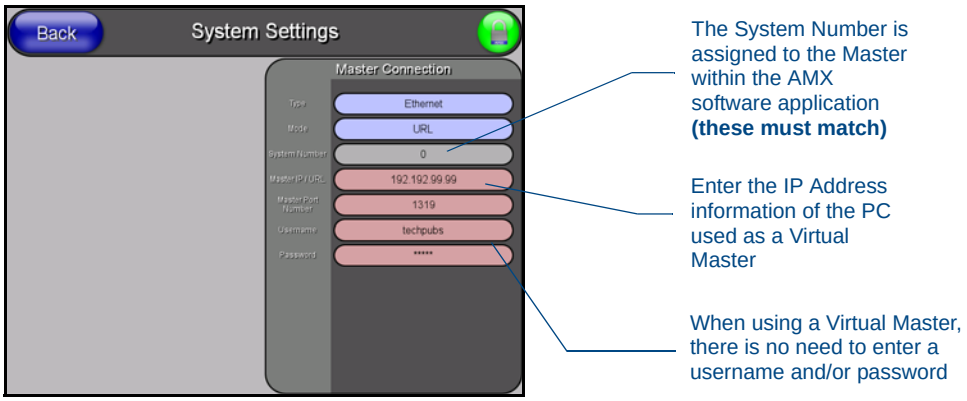

Back
System Settings
Master Connection
Ethernet
URL
0
192.192.99.99
1319
techpubs
The System Number is assigned to the Master within the AMX software application (these must match)
Enter the IP Address information of the PC used as a Virtual Master
When using a Virtual Master, there is no need to enter a username and/or password

FIG. 29 Sample System Settings page (for Virtual Master communication)

15. Press the blue *Type* field until the choice cycles to the word **Ethernet.**
16. Press the *Mode* field until the choice cycles to the word **URL**.
    - By selecting **URL**, the System Number field becomes read-only (grey) because the panel pulls this value directly from the communicating target Master (virtual or not). A Virtual Master system value can be set within the active AMX software applications such as: NetLinx Studio, TPD4, or IREdit.
17. Press the *Master IP/URL* field to open a Keyboard and enter the IP Address of the PC used as the Virtual Master.

18. Click **Done** to accept the new value and return to the *System Settings* page.
19. Do not alter the Master Port Number value (*this is the default value used by NetLinx*).
20. Press the **Back** button to open the *Protected Setup* page.
21. Press the on-screen **Reboot** button to both save any changes and restart the panel.

Using G4 Web Control to Interact with a G4 Panel

The G4 Web Control feature allows you to use a PC to interact with a G4 enabled panel via the web. This feature works in tandem with the new browser-capable NetLinx Security firmware update (***build 300 or higher***). G4 Web Control is only available with the latest Modero panel firmware.

Refer to the *G4 Web Control Settings Page* section on page 73 for more detailed field information.

NOTE

*Verify your NetLinx Master (ME260/64 or NI-Series) has been installed with the latest firmware KIT file from **www.amx.com**. Refer to your NetLinx Master instruction manual for more detailed information on the use of the new web-based NetLinx Security.*

1. Press and hold the two lower buttons on both sides of the display for **3 seconds** to open the Setup page.
2. Press the **Protected Setup** button (located on the lower-left of the panel page) to open the Protected Setup page and display an on-screen keypad.
3. Enter ***1988*** into the Keypad's password field (***1988*** *is the default password*).

NOTE

Clearing Password #5, from the initial Password Setup page, removes the need for you to enter the default password before accessing the Protected Setup page.

4. Press **Done** when finished.
5. Press the **G4 WebControl** button to open the G4 Web Control page (FIG. 30).

FIG. 30 G4 Web Control page

6. Press the **Enable/Enabled** button until it toggles to **Enabled** (*light blue color*).
7. The *Network Interface Select* field is read-only and displays the method of communication to the web.
   - **Wireless** is used when a wireless card is detected within the internal card slot. This method provides an indirect communication to the web via a pre-configured Wireless Access Point.

NOTE

*The Network Interface Select field is read-only and defaulted to **Wireless (since there is no Ethernet cable connection)**.*

8. Press the *Web Control Name* field to open the Web Name keyboard.

9. From the Web Name keyboard, enter a unique alpha-numeric string to identify this panel. This information is used by the NetLinx Security Web Server to display on-screen links to the panel. *The on-screen links use the IP Address of the panel and not the name for communication* (FIG. 31).

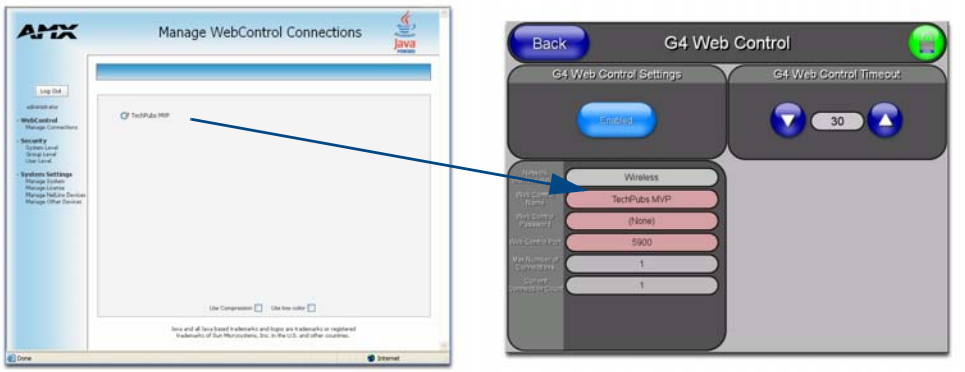


FIG. 31 Sample relationship between G4 Web Control and Mange WebControl Connections window

10. Press **Done** after you are finished assigning the alpha-numeric string for the Web Control name.
11. Press the *Web Control Password* field to open the Web Password keyboard.
12. From the Web Password keyboard, enter a unique alpha-numeric string to be assigned as the G4 Authentication session password associated with VNC web access of this panel.
13. Press **Done** after you are finished assigning the alpha-numeric string for the Web Control password.
14. Press the *Web Control Port* field to open the Web Port Number keypad.
15. Within the keypad, enter a unique numeric value to be assigned to the port the VNC Web Server is running on. The default value is ***5900***.
16. Press **Done** when you are finished entering the value. *The remaining fields within the G4 Web Control Settings section of this page are read-only and cannot be altered.*
17. Press the **Up/Down** arrows on either sides of the G4 Web Control *Timeout* field to increase or decrease the amount of time the panel can remain idle (***no cursor movements***) before the session is closed and the user is disconnected.
18. Press the **Back** button to open the Protected Setup page.
19. Press the on-screen **Reboot** button to save any changes and restart the panel.

NOTE

Verify your NetLinx Master's IP Address and System Number have been properly entered into the Master Connection section of the System Settings page.

Using your NetLinx Master to control the G4 panel

Refer to your particular NetLinx Master's instruction manual for detailed information on how to download the latest firmware from **www.amx.com**. This firmware build enables SSL certificate identification and encryption, HTTPS communication, ICSP data encryption, and disables the ability to alter the Master security properties via a TELNET session.

NOTE

In order to fully utilize the SSL encryption, your web browser should incorporate the an encryption feature. This encryption level is displayed as a Cipher strength.

Once the Master's IP Address has been set through NetLinx Studio version 2.x or higher:

1. Launch your web browser.
2. Enter the IP Address of the target Master (***ex: http://198.198.99.99***) into the web browser's *Address* field.
3. Press the **Enter** key on your keyboard to begin the communication process between the target Master and your computer.
   - Initially, the Master Security option is disabled (from within the **System Security** page) and no username and password is required for access or configuration.
   - Both HTTP and HTTPS Ports are enabled by default (via the **Manage System > Server** page).
   - If the Master has been previously configured for secured communication, click **OK** to accept the AMX SSL certificate (*if SSL is enabled*) and then enter a valid username and password into the fields within the *Login* dialog.
4. Click **OK** to enter the information and proceed to the Master's Manage WebControl Connections window.
5. This Manage WebControl Connections page (FIG. 32) is accessed by clicking on the **Manage connections** link (*within the Web Control section within the Navigation frame*). Once activated, this page displays links to G4 panels running the latest G4 Web Control feature (*previously setup and activated on the panel*).

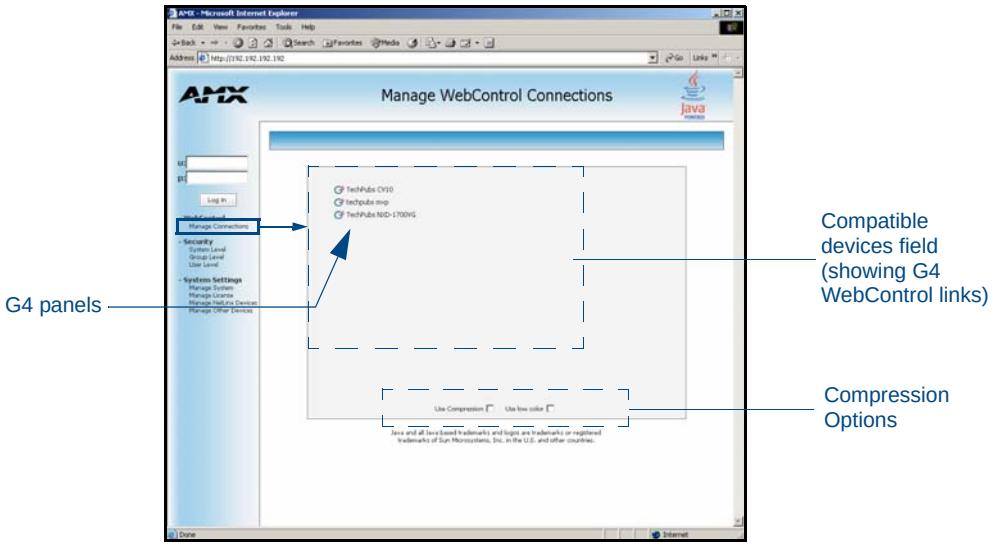


FIG. 32 Manage WebControl Connections page (populated with compatible panels)

6. Click on the G4 panel name link associated with the target panel. A secondary web browser window appears on the screen (FIG. 33).
7. Click **Yes** from the Security Alert popup window to agree to the installation of the G4 WebControl application on your computer. This application contains the necessary Active X and VNC client applications necessary to properly view and control the panel pages from your computer.

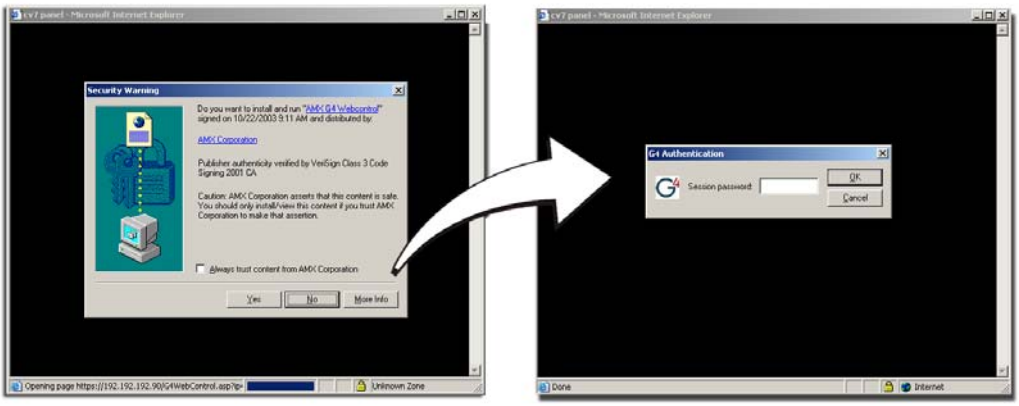


FIG. 33 Web Control VNC installation and Password entry screens

NOTE

The G4 Web Control application is sent by the panel to the computer that is used for communication. Once the application is installed, this popup will no longer appear. This popup will only appear if you are connecting to the target panel using a different computer.

8. In some cases, you might get a *Connection Details* dialog (FIG. 34) requesting a VNC Server IP Address. This is the IP Address not the IP of the Master but of the target touch panel. Depending on which method of communication you are using, it can be found in either the:
   - **Wired Ethernet** - System Settings > IP Settings section within the *IP Address* field.
   - **Wireless** - Wireless Settings > IP Settings section within the *IP Address* field.
   - If you do not get this field continue to step 9.

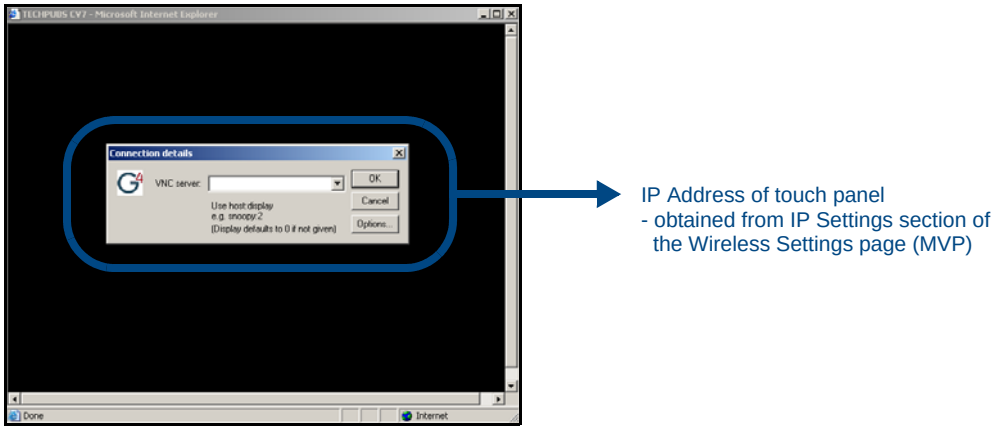


FIG. 34 Connection Details dialog

9. If a WebControl password was setup on the G4 WebControl page, a G4 Authentication Session password dialog box appears on the screen within the secondary browser window.
10. Enter the Web Control session password into the *Session Password* field (FIG. 34). *This password was previously entered into the Web Control Password field within the G4 Web Control page on the panel.*
11. Click **OK** to send the password to the panel and begin the session. A confirmation message appears stating *"Please wait, Initial screen loading."*.

The secondary window then becomes populated with the same G4 page being displayed on the target G4 panel. A small circle appears within the on-screen G4 panel page and corresponds to the location of the mouse cursor. A left-mouse click on the computer-displayed panel page equates to an actual touch on the target G4 panel page.

Upgrading MVP Firmware

Except for the MVP-KS (Kickstand for MVP Panels), all MVP panels and their accessories have on-board firmware which is upgradeable through the use of the latest NetLinx Studio. The MVP acts as a bridge between the NetLinx Studio program and the installed docking station. Studio can download firmware to the target docking station by using the connected MVP to pass-along the Kit file to the docking station. Refer to the *NetLinx Studio version 2.x or higher* Instruction Manual for more information on how to download firmware to both a panel and a docking station.

NOTE

The latest firmware 2.70.xx (or higher) kit file is panel-specific. This new firmware also provides both backwards compatibility with the previous 802.11b cards and new security protocols for the new 802.11g wireless CF card.

1. Upload the latest Kit file (**SW5965_xx version 2.70.xx or higher**) to your specific Modero touch panel and then confirm the firmware file update was successful. Refer to your panel's instruction manual for detailed communication and Kit file upload procedures.

CAUTION

If you don't first update the firmware file on the panel, before proceeding with the card upgrade process, you will be required to configure NetLinx Studio to communicate with the target panel via a direct USB connection. In this communication scenario, your PC acts as a Virtual NetLinx Master establishing a secure USB connection to the target panel and then uploading the new Kit file.

Before beginning the Upgrade process:

- Setup and configure your NetLinx Master. Refer to the your particular NetLinx Master Instruction Manual for detailed setup procedures.
- Calibrate and prepare the communication pages on the Modero panel for use. Refer to the *Panel Calibration* section on page 11.
- Refer to the NetLinx Studio version 2.x or higher Help file for more information on uploading files via Ethernet.
- Configure your panel for either direct connect or wireless communication. Refer to the *Configuring Communications* section on page 13 for more detailed information about Ethernet or Wireless communication.

WARNING

It is recommended that firmware Kit files only be transferred over a direct connection and only when the panel is connected to a power supply. If battery power or wireless connection fails during a firmware upgrade, the panel flash file system may become corrupted.

The process of updating firmware involves the use of a communicating NetLinx Master. The required steps for updating firmware to a Modero panel are virtually identical to those necessary for updating Kit files to a NetLinx Master (*except the target device is a panel instead of a Master*). Refer to either your Master's literature or Studio 2.x Help file for those procedures.

WARNING

A touch panel which is not using a valid username and password will not be able to communicate with a secured Master. If you are updating the firmware on or through a panel which is not using a username or password field, you must first remove the Master Security feature to establish an unsecured connection.

Upgrading the Modero Firmware via the USB port

Before beginning with this section, verify your panel is powered and the Type-A USB connector is securely inserted into the PC's USB port. **The panel must be powered-on before connecting the mini-USB connector to the panel.**

WARNING

Establishing a USB connection between the PC and the panel, prior to installing the USB Driver will cause a failure in the USB driver installation.

Step 1: Configure the panel for a USB Connection Type

1. After the installation of the USB driver has been completed, confirm the proper installation of the large Type-A USB connector to the PC's USB port, and restart your machine.
2. After the panel powers-up, press and hold the two lower buttons on both sides of the display for **3 seconds** to continue with the setup process and proceed to the Setup page.
3. Select **Protected Setup > System Settings** (located on the lower-left) to open the System Settings page.
4. Toggle the blue *Type* field (***from the Master Connection section***) until the choice cycles to **USB**.

NOTE

***ALL** fields are then greyed-out and read-only, but still display any previous network information.*

5. Press the **Back** button on the touch panel to return to the Protected Setup page.
6. Press the on-screen **Reboot** button to both save any changes and **restart the panel.** *Remember that the panel's connection type must be set to **USB** prior to rebooting the panel and prior to inserting the USB connector.*
7. **ONLY AFTER** the unit displays the first panel page, **THEN** insert the mini-USB connector into the Program Port on the panel. It may take a minute for the panel to detect the new connection and send a signal to the PC (*indicated by a green System Connection icon*).
   - If a few minutes have gone by and the System Connection icon still does not turn green, complete the procedures in the following section to setup the Virtual Master and refresh the System from the Online Tree. This action sends out a request to the panel to respond and completes the communication (turning the System Connection icon green).
8. Navigate back to the System Settings page.

Step 2: Prepare Studio for communication via the USB port

1. Launch NetLinx Studio 2.x (default location is **Start > Programs > AMX Control Disc > NetLinx Studio 2 > NetLinx Studio 2**).
2. Select **Settings > Master Communication Settings**, from the Main menu to open the Master Communication Settings dialog (FIG. 35).

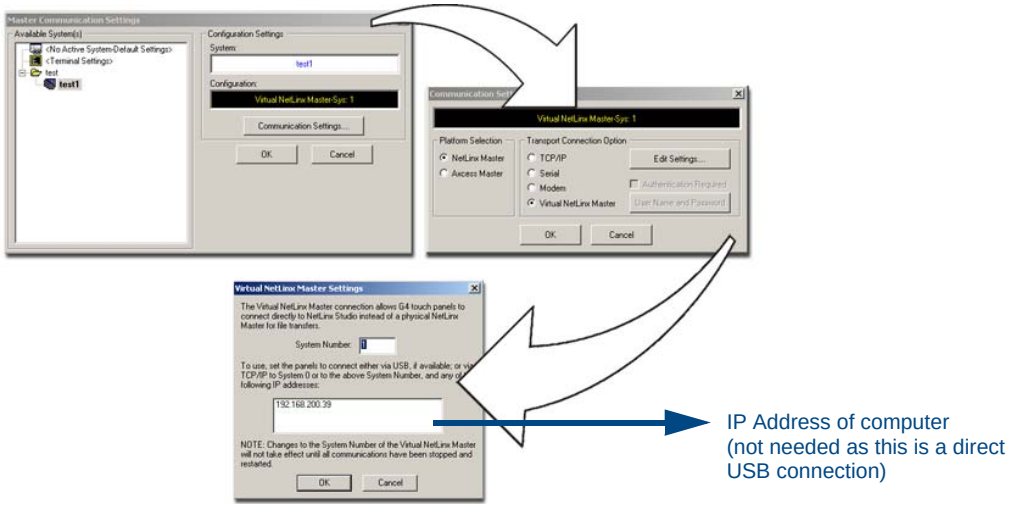


FIG. 35 Assigning Communication Settings for a Virtual Master

3. Click the **Communications Settings** button to open the *Communications Settings* dialog.
4. Click on the **NetLinx Master** radio button (*from the Platform Selection section*) to indicate that you are working as a NetLinx Master.
5. Click on the **Virtual Master** radio box (*from the Transport Connection Option section*) to indicate you are wanting to configure the PC to communicate directly with a panel. Everything else such as the Authentication is greyed-out because you are not going through the Master's UI.

6. Click the **Edit Settings** button (*on the Communications Settings dialog*) to open the *Virtual NetLinx Master Settings* dialog (FIG. 35).
7. From within this dialog enter the System number (default is **1**).
8. Click **OK** three times to close the open dialogs, save your settings, and return to the main NetLinx Studio application.
9. Click the **OnLine Tree** tab in the Workspace window to view the devices on the Virtual System.
   The default System value is one.
10. Right-click on the *Empty Device Tree/System* entry and select **Refresh System** to re-populate the list.
    The panel will not appear as a device below the virtual system number (in the Online Tree tab) until both the system number used in step 7 for the VNM is entered into the Master Connection section of the System Settings page and the panel is restarted.

Step 3: Confirm and Upgrade the firmware via the USB port

Use the CC-USB Type-A to Mini-B 5-wire programming cable (**FG10-5965**) to provide communication between the mini-USB Program port on the touch panel and the PC. This method of communication is used to transfer firmware Kit files and TPD4 touch panel files.

NOTE

A mini-USB connection is only detected after it is installed onto an active panel. Connection to a previously powered panel which then reboots, allows the PC to detect the panel and assign an appropriate USB driver.

1. Verify this direct USB connection (Type-A on the panel to mini-USB on the panel) is configured properly using the steps outlined in the previous two sections.
2. With the panel already configured for USB communication and the Virtual Master setup within NetLinx Studio, its now time to verify the panel is ready to receive files.
3. After the Communication Verification dialog window verifies active communication between the Virtual Master and the panel, click the **OnLine Tree** tab in the Workspace window (FIG. 36) to view the devices on the Virtual System. *The default System value is **one**.*
4. Right-click on the System entry (FIG. 36) and select **Refresh System** to re-populate the list. Verify the panel appears in the **OnLine Tree** tab of the Workspace window.
   The default Modero panel value is 10001.

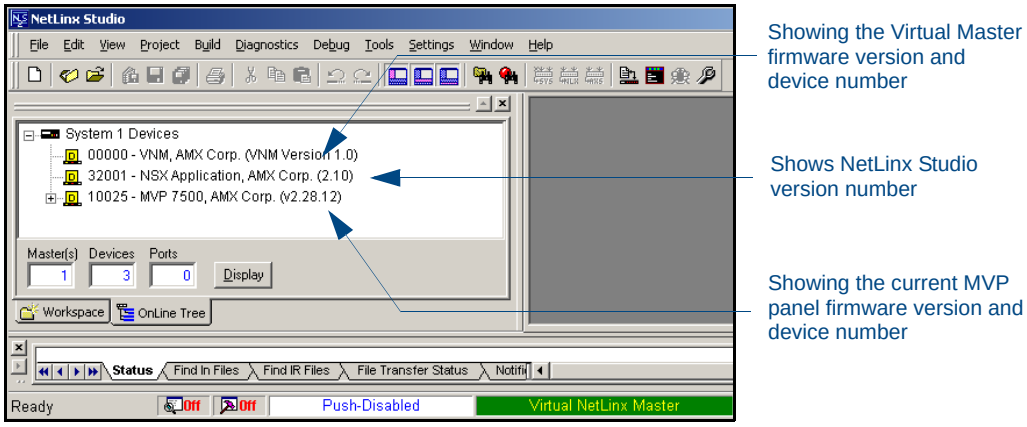


FIG. 36 NetLinx Workspace window (showing panel connection via a Virtual NetLinx Master)

NOTE

*The panel-specific firmware is shown on the right of the listed panel. Download the latest firmware file from **www.amx.com** and then save the Kit file to your computer. Note that each kit file is intended for download to its corresponding panel.*

5. If the panel firmware version is not the latest available; locate the latest firmware file from **www.amx.com**.
6. Click on the desired Kit file link and after you've accepted the Licensing Agreement, verify you have downloaded the Modero Kit file to a known location.

7. Select **Tools > Firmware Transfers > Send to NetLinx Device** from the Main menu to open the Send to NetLinx Device dialog (**B** in FIG. 37). Verify the panel's System and Device number values match those values listed within the System folder in the **OnLine Tree** tab of the Workspace window (**A** in FIG. 37).

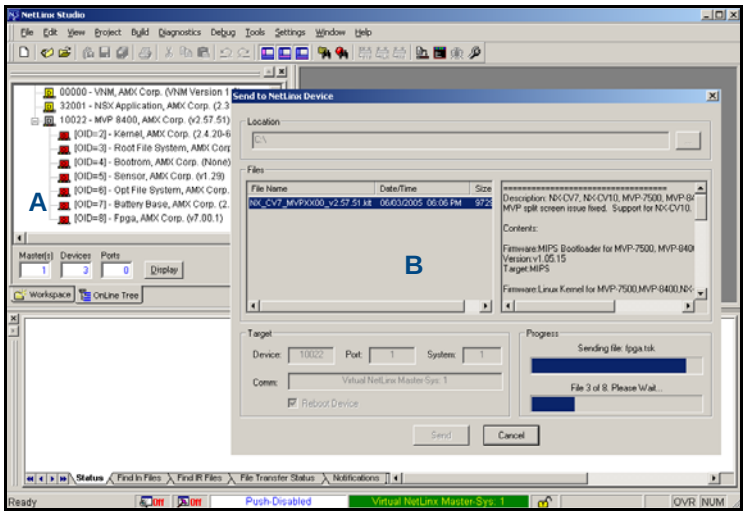


FIG. 37 Using USB for a Virtual Master transfer

8. Select the panel's Kit file from the **Files** section.
9. Enter the **Device** value associated with the panel and the **System** number associated with the Master (*listed in the OnLine Tree tab of the Workspace window*). *The Port field is greyed-out.*
10. Click the **Reboot Device** checkbox. This causes the touch panel to reboot after the firmware update process is complete. *The reboot of the panel can take up 30 seconds after the firmware process has finished.*
11. Click **Send** to begin the transfer. The file transfer progress is indicated on the bottom-right of the dialog (**B** in FIG. 37).
12. As the panel is rebooting, temporarily unplug the USB connector on the panel until the panel has completely restarted.
13. Once the first panel page has been displayed, reconnect the USB connector to the panel.
14. Right-click the associated System number and select **Refresh System**. This causes a refresh of all project systems, establishes a new connection to the Master, and populates the System list with devices on your particular system.
15. Confirm the panel has been properly updated to the correct firmware version.

Upgrading the Docking Station Firmware via USB

The following accessory devices are firmware upgradeable:

- MVP-TDS Table Top Docking Station (**FG5965-10**)
- MVP-WDS Wall/Flush Mount Docking Station - Black (**FG5965-11**)
- MVP-WDS Wall/Flush Mount Docking Station - Silver (**FG5965-21**)

This device is not given a unique device number which would ordinarily appear within the Online Tree tab of NetLinx Studio. It appears as a battery base below the target panel which it is a part of as seen below in FIG. 38.

The only way to upgrade the firmware of these accessory items is to send the accessory's firmware through a target panel. Its this panel's device number which is entered within the *Send to NetLinx Device transfer* dialog in Studio.

Step 1: Prepare the Docking Station for firmware transfer via USB

Before beginning with this section:

- Verify the MVP is securely attached to the docking station and communicating properly.
- Verify that the panel is communicating from the mini-USB port to the Virtual NetLinx Master (VNM).

1. Complete the instructions for configuring the NetLinx Master for IP communication found in the *Upgrading the Modero Firmware via the USB port* section on page 33.

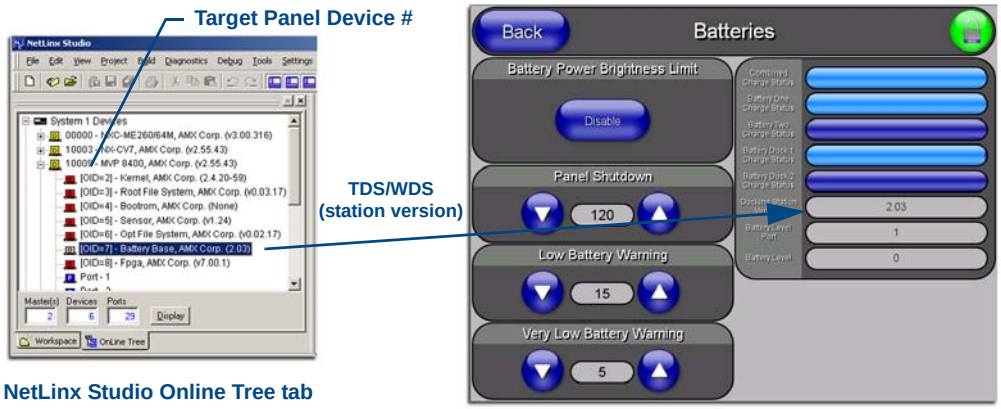


FIG. 38 Location of Firmware version information within NetLinx Studio

2. After the panel powers-up, press and hold the two lower buttons on both sides of the display for **3 seconds** to continue with the setup process and proceed to the Setup page.
3. Press the **Batteries** button to open the Batteries page (FIG. 39).

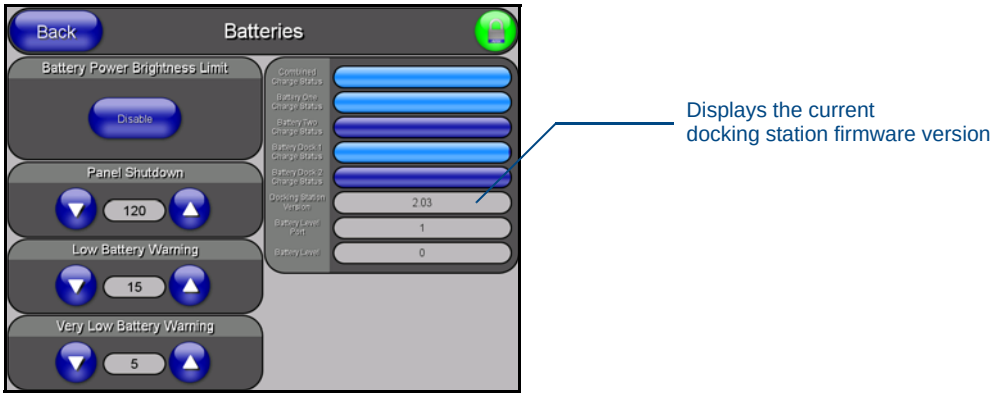


FIG. 39 Batteries page

NOTE

*The docking station firmware is shown on the right of the Batteries page. Verify you have downloaded the latest firmware file from **www.amx.com** and then save the Kit file to your computer.*

Step 2: Upgrade the Docking Station firmware via USB

1. Complete the procedures outlined in the *Step 1: Configure the panel for a USB Connection Type* section on page 34.
2. Prepare NetLinx Studio for communication to the panel via a Virtual Master by following the procedures outlined in the *Step 2: Prepare Studio for communication via the USB port* section on page 34.
3. After the Communication Verification dialog window verifies active communication between the Virtual Master and the panel, click the **OnLine Tree** tab in the Workspace window to view the devices on the Virtual System. *The default System value is one.*
4. Right-click on the System entry and select **Refresh System** to re-populate the list. Verify the panel appears in the **OnLine Tree** tab of the Workspace window.
   The default Modero panel value is 10001.
5. Locate the latest firmware file from the **www.amx.com > Tech Center > Downloadable Files > Firmware Files > Modero Panels firmware (MVP Docking Stations: MVP-TDS/WDS)** section of the website.
6. Click on the desired Kit file link and after you've accepted the Licensing Agreement, verify you have downloaded the Docking Station Kit file to a known location.

7. Select **Tools > Firmware Transfers > Send to NetLinx Device** from the Main menu to open the Send to NetLinx Device dialog (FIG. 40). Verify the panel's System and Device number values match those values listed within the System folder in the **OnLine Tree** tab of the Workspace window.

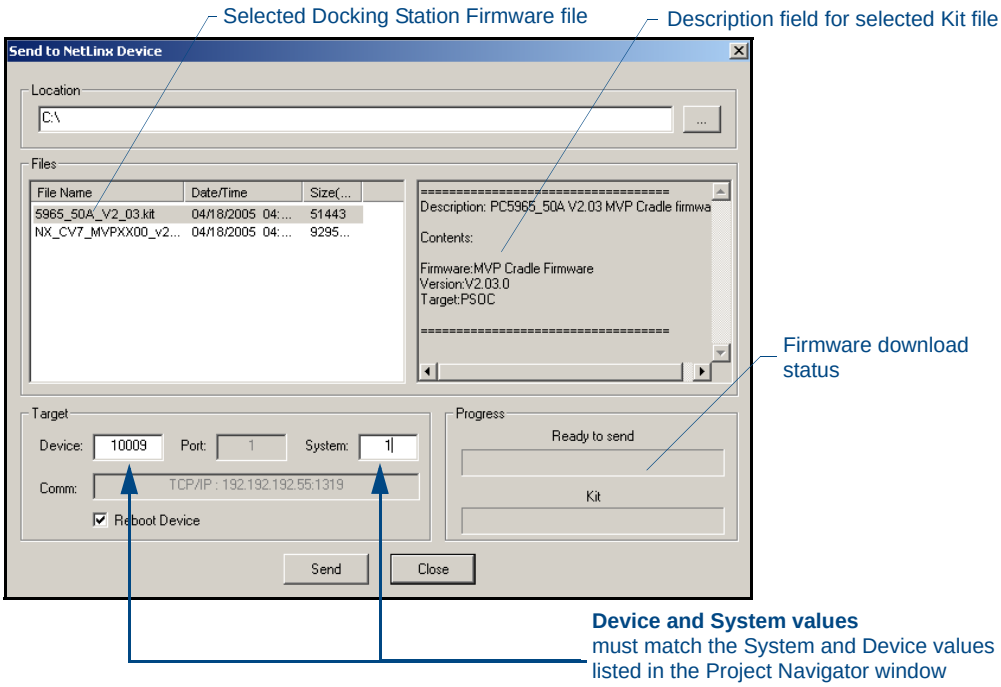


FIG. 40 Send to NetLinx Device dialog (showing docking station firmware update via USB)

8. Select the docking station's Kit file (*ending in VXX.kit*) from the **Files** section (FIG. 40).
9. Enter the **Device** number associated with the panel and the **System** number associated with the Master (*listed in the OnLine Tree tab of the Workspace window*). *The Port field is greyed-out.*

NOTE

Firmware upgrades can not be done directly to the docking station but must be routed through the MVP panel.

10. Click the **Reboot Device** checkbox. This causes the touch panel to reboot after the firmware update process is complete. *The reboot of the panel can take up 30 seconds after the firmware process has finished.*
11. Click **Send** to begin the transfer. The file transfer progress is indicated on the bottom-right of the dialog.
12. As the panel is rebooting, temporarily unplug the USB connector on the panel until the panel has completely restarted.
13. Once the first panel page has been displayed, reconnect the USB connector to the panel.
14. Right-click the associated System number and select **Refresh System**. This causes a refresh of all project systems, establishes a new connection to the Master, and populates the System list with devices on your particular system.
15. After the panel powers-up, press and hold the two lower buttons on both sides of the display for **3 seconds** to continue with the setup process and proceed to the Setup page.
16. Press the **Batteries** button (located on the lower-left) to open the Batteries page and confirm the new firmware does not read 0.00.

WARNING

If the Base Version field displays 0.00, this means there was an error in the firmware upload process. Re-install the base firmware and re-confirm that the new base version no longer reads 0.00.

Although firmware upgrades can be done over wireless Ethernet; it is recommended that firmware KIT files be transferred over a direct USB connection and only when the panel is connected to a power supply. If battery power or wireless connection fails during a firmware upgrade, the panel flash file system may become corrupted.

Setup Pages

AMX Modero panels feature on-board Setup pages. Use the options in the Setup pages to access panel information and make various configuration changes.

To access the *Setup* pages, press the two lower external pushbuttons on either side of the panel simultaneously and hold for 3 seconds (FIG. 41).

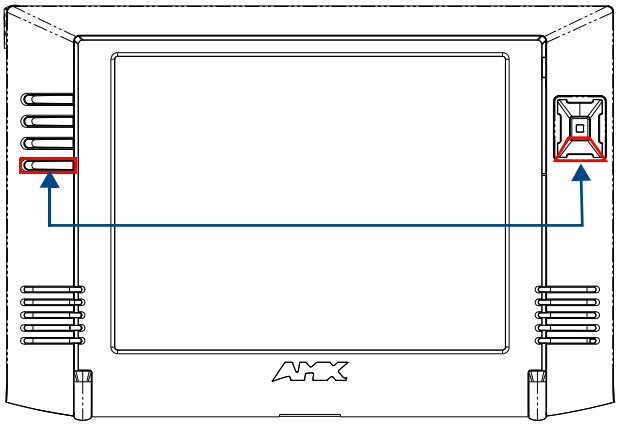

Setup Page Access buttons:
Press and hold simultaneously for 3 seconds to access the Setup pages
Press and hold for 10 seconds to access the Calibration page.

FIG. 41 Setup Page Access buttons

Navigation Buttons

The following Navigation buttons (FIG. 42) appear on the left side of the Setup page:

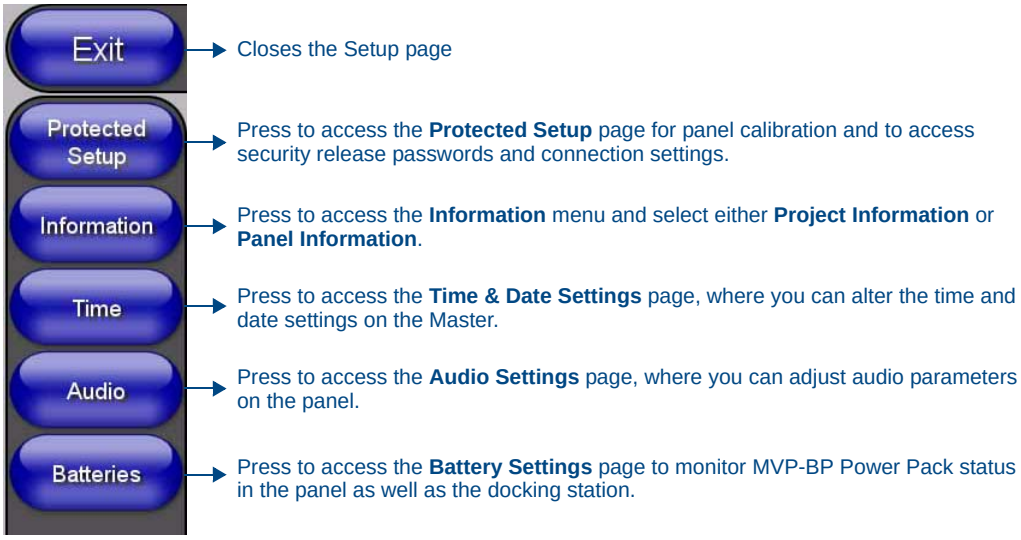

Exit
Closes the Setup page
Protected Setup
Press to access the **Protected Setup** page for panel calibration and to access security release passwords and connection settings.
Information
Press to access the **Information** menu and select either **Project Information** or **Panel Information**.
Time
Press to access the **Time & Date Settings** page, where you can alter the time and date settings on the Master.
Audio
Press to access the **Audio Settings** page, where you can adjust audio parameters on the panel.
Batteries
Press to access the **Battery Settings** page to monitor MVP-BP Power Pack status in the panel as well as the docking station.

FIG. 42 Setup Page Navigation Buttons

Setup Pages

The Setup page (FIG. 43) allows quick access to several basic panel properties:

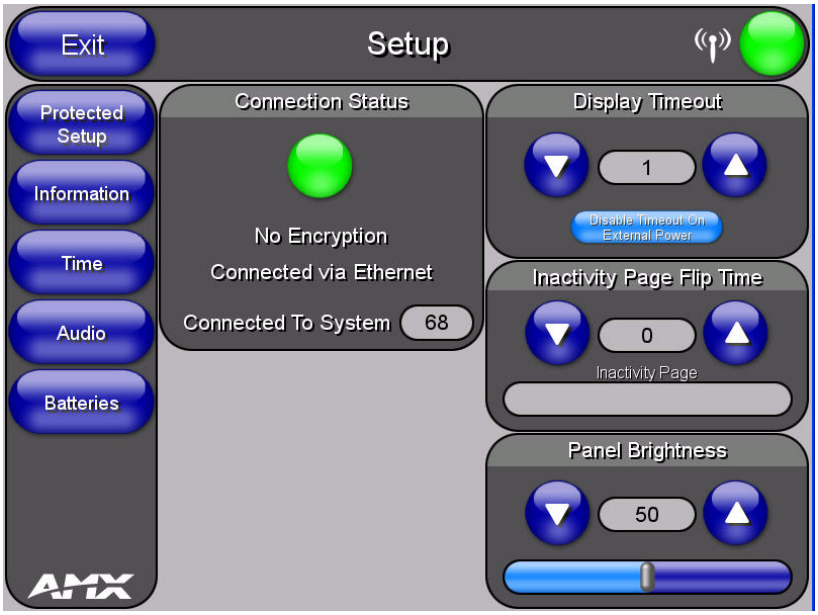


FIG. 43 MVP-8400 Setup page

Features on this page include:

Setup Page	
Navigation Buttons:	The buttons along on the left side of the page provide access to secondary Setup pages (see following sections).
WiFi/Wired icon:	The icon to the left of the Connection Status Icon displays whether the current connection to the Master is *Wireless* (image of a radio antenna) or *Wired* (image of three networked computers).
Connection Status icon:	The icon in the upper-right corner of each Setup page shows online/offline state of the panel to the master. • Bright red - disconnected • Bright green - connected. Blinks when a blink message is received to dark green every 5 seconds for half a second then go back to bright green. • Bright yellow - panel missed a blink message from the master. It will remain yellow for 3 missed blink messages and then turn red. It will return to green when a blink message is received. ***Note**: a Lock appears on the icon if the panel is connected to a secured NetLinx Master.*
Connection Status:	Displays whether the panel is communicating externally as well as the encryption status of the Master, the connection type (***Ethernet** or **USB***), and what System the panel is connected to. • Until a connection is established, the message displayed is: "*Attempting via...*". • When a connection is established, the message displayed is either: "*Connected via Ethernet* "or "*Connected via USB* ". • The word "*Encrypted*" appears when an encrypted connection is established with a NetLinx Master. ***Note**: The panel must be rebooted before incorporating any panel communication changes and to detect Ethernet connections.*

Setup Page (Cont.)	
Display Timeout:	Indicates the length of time that the panel can remain idle before activating Sleep mode (causing the LCD to power down). • Press the UP/DN buttons to increase/decrease the Display Timeout setting. Range = 0 - 240 (minutes). • Set the timeout value to zero to disable Sleep mode. ***Note**: Small timeout values maximize the life of the battery charge.*
Inactivity Page Flip Timeout:	Indicates the length of time that the panel can remain idle before automatically flipping to a pre-selected page. • Press the UP/DN buttons to increase/decrease the Inactivity Page Flip Timeout setting. Range = 0 - 240 (minutes). • Set the timeout value to zero to disable Inactivity Page Flip mode. ***Note**: The touch panel page used for the Inactivity page flip is shown within a small Inactivity Page field.*
Panel Brightness:	Sets the display brightness level of the panel. • Press the UP/DN buttons to adjust the brightness level. Range = 0 - 100. ***Note**: The on-screen bargraph can be dragged to adjust the brightness level which is then reflected as a numeric value in the Panel Brightness field.*

Protected Settings

The *Protected Settings* page and its contents are covered in more detail in the *Protected Setup Pages* on page 52.

Information

The **Information** button provides a menu to select either the *Project Information Page* section on page 44 or the *Panel Information Page* section on page 45. Select either option to access that page.

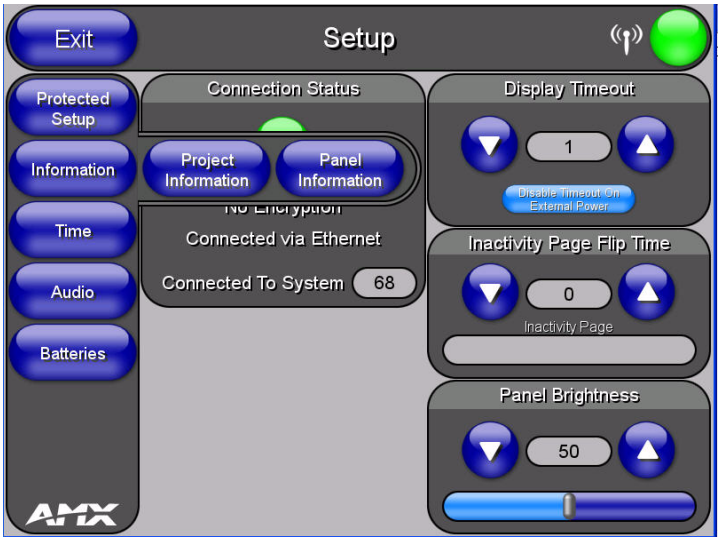


FIG. 44 Information menu

Project Information Page

The Project Information page displays the project properties of the TPDesign4 project file currently loaded on the panel (FIG. 45).

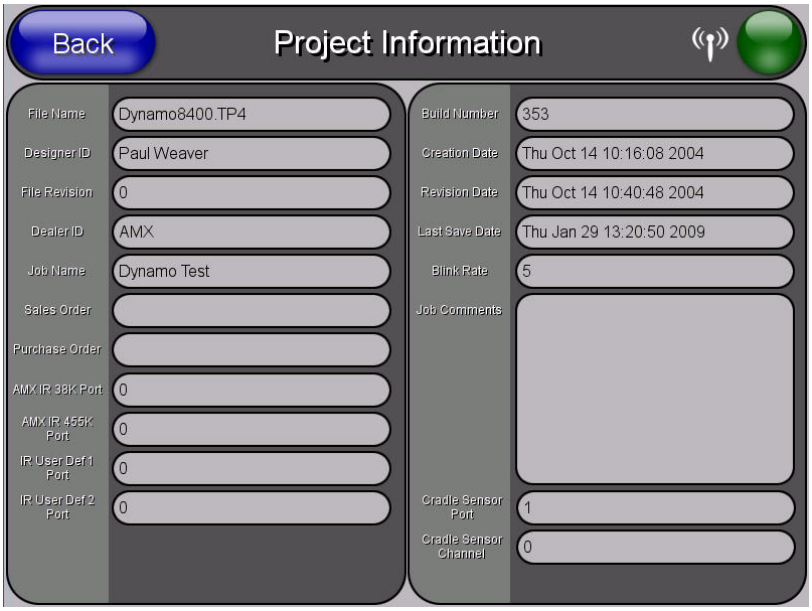


FIG. 45 Project Information page

Features on this page include:

Project Information Page	
Back:	Saves all changes and returns to the previous page.
WiFi/Wired icon:	The icon to the left of the Connection Status Icon displays whether the current connection to the Master is *Wireless* (image of a radio antenna) or *Wired* (image of three networked computers).
Connection Status icon:	The icon in the upper-right corner of each Setup page shows online/offline state of the panel to the master. • Bright red - disconnected • Bright green - connected. Blinks when a blink message is received to dark green every 5 seconds for half a second then go back to bright green. • Bright yellow - panel missed a blink message from the master. It will remain yellow for 3 missed blink messages and then turn red. It will return to green when a blink message is received. ***Note**: a Lock appears on the icon if the panel is connected to a secured NetLinx Master.*
File Name:	Displays the name of the TPDesign4 project file downloaded to the panel.
Designer ID:	Displays the designer information.
File Revision:	Displays the revision number of the file.
Dealer ID:	Displays the dealer ID number (*unique to every dealer and entered in TPD4*).
Job Name:	Displays the job name.
Sales Order:	Displays the sales order information.
Purchase Order:	Displays the purchase order information.
AMX IR 38K Port:	Displays the AMX 38 kHz IR channel port used by the IR Emitter on the panel. • This information is specified in TPD4 (Project Properties > IR Emitters & Receivers tab). • For example if you set the AMX IR 38K Port to *7* and then put a button on the panel with a channel code of *5* and a port of *7*, it will trigger the IR code in slot 5 of the AMX IR 38K Port.

Project Information Page (Cont.)	
AMX IR 455K Port:	Displays the AMX 455 kHz IR channel port used by the IR Emitter on the panel.
IR User Def 1 Port:	Displays the User Defined IR channel port used by the IR Emitter on the panel. • ***Note**: User Defined ports can be downloaded by the user and are customizable, whereas the AMX ones are fixed.*
IR User Def 2 Port:	Displays the User Defined IR channel port used by the IR Emitter on the panel.
Build Number:	Displays the build number information of the TPD4 software used to create the project file.
Creation Date:	Displays the project creation date.
Revision Date:	Displays the last revision date for the project.
Last Save Date:	Displays the last date the project was saved.
Blink Rate:	Displays the feedback blink rate, in .10 second increments.
Job Comments:	Displays any comments associated to the job (from the TPD4 project file).
Cradle Sensor Port:	Displays the port assignment being used to report Cradle Sensor information.
Cradle Sensor Channel:	Displays the channel assignment being used to report Cradle Sensor information. The channel is turned on when the panel is docked (in either the TDS or WDS docking stations.

NOTE

IR receivers and transmitters on G4 panels share the device address number of the panel.

Panel Information Page

The Panel Information page provides detailed panel information (FIG. 46).

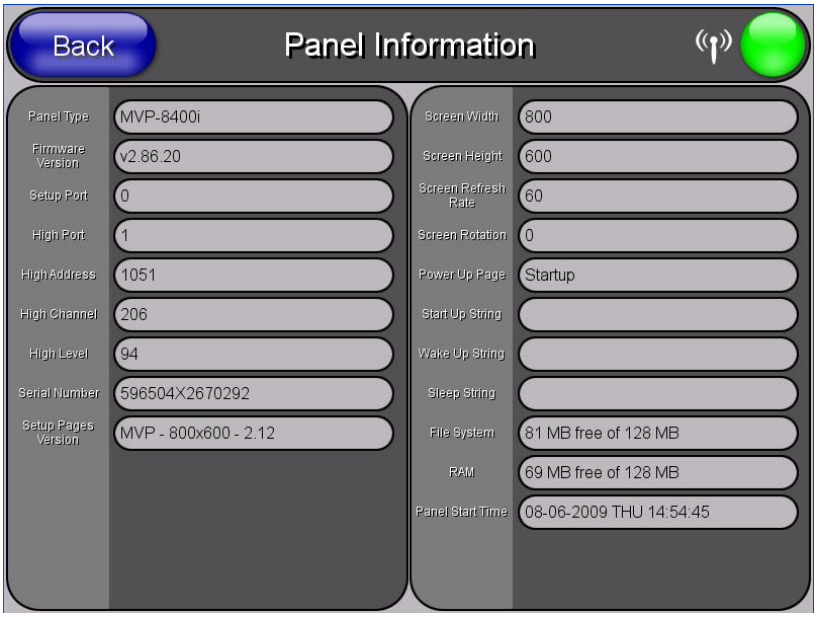


FIG. 46 Panel Information page

Features on this page include:

Panel Information Page	
Back:	Saves all changes and returns to the previous page.
WiFi/Wired icon:	The icon to the left of the Connection Status Icon displays whether the current connection to the Master is *Wireless* (image of a radio antenna) or *Wired* (image of three networked computers).
Connection Status icon:	The icon in the upper-right corner of each Setup page shows online/offline state of the panel to the master. • Bright red - disconnected • Bright green - connected. Blinks when a blink message is received to dark green every 5 seconds for half a second then go back to bright green. • Bright yellow - panel missed a blink message from the master. It will remain yellow for 3 missed blink messages and then turn red. It will return to green when a blink message is received. ***Note**: a Lock appears on the icon if the panel is connected to a secured NetLinx Master.*
Panel Type:	Displays the model of the panel being used.
Firmware Version:	Displays the version number of the G4 firmware loaded on the panel.
Setup Port:	Displays the setup port information (value) being used by the panel.
High Port:	Displays the high port (port count) value for the panel.
High Address:	Displays the high address (address count) value for the panel.
High Channel:	Displays the high channel (channel count) value for the panel.
High Level:	Displays the high level (level count) value being used by the panel.
Serial Number:	Displays the specific serial number value assigned to the panel.
Setup Pages Version:	Displays the type and version of the Setup pages being used by the panel.
Screen Width:	Displays the screen width (in pixels). • MVP-8400 = 800
Screen Height:	Displays the screen height (in pixels). • MVP-8400 = 600 pixels.
Screen Refresh Rate:	Displays the video refresh rate applied to the incoming video signal from the panel.
Screen Rotation:	Displays the degree of rotation applied to the on-screen image.
Power Up Pages:	Displays the page assigned to display after the panel is powered-up.
Start Up String:	Displays the start-up string.
Wake Up String:	Displays the wake up string used after an activation from a timeout.
Sleep String:	Displays the sleep string used during a panel's sleep mode.
File System:	Displays the amount of Compact Flash memory available on the panel.
RAM:	Displays the available RAM (or Extended Memory module) on the panel.
Panel Start Time:	Displays the last time the panel booted.

Time & Date Settings

The options on the Time & Date Settings page (FIG. 47) allow you to set and adjust time and date information on the NetLinx Master. If the time and/or date on the Master is modified, all connected devices will be updated to reflect the new information.

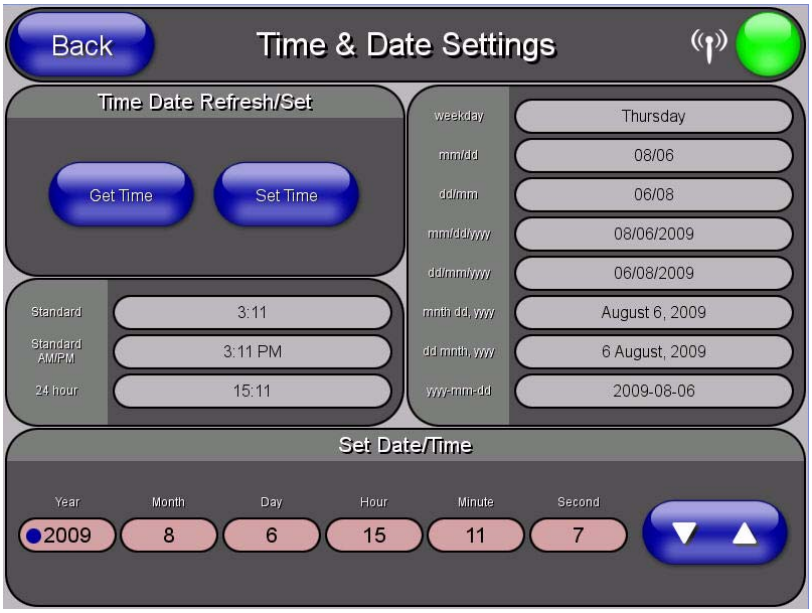


FIG. 47 Time and Date Setup page

NOTE

MVP touch panels do not have an on-board clock. The only way to modify a panel's time without altering the Master is via NetLinx Code.

Features on this page include:

Time & Date Settings Page	
Back:	Saves all changes and returns to the previous page.
WiFi/Wired icon:	The icon to the left of the Connection Status Icon displays whether the current connection to the Master is *Wireless* (image of a radio antenna) or *Wired* (image of three networked computers).
Connection Status icon:	The icon in the upper-right corner of each Setup page shows online/offline state of the panel to the master. • Bright red - disconnected • Bright green - connected. Blinks when a blink message is received to dark green every 5 seconds for half a second then go back to bright green. • Bright yellow - panel missed a blink message from the master. It will remain yellow for 3 missed blink messages and then turn red. It will return to green when a blink message is received. ***Note**: a Lock appears on the icon if the panel is connected to a secured NetLinx Master.*
Time Date Refresh/Set:	This section provides two options: • The **Get Time/Date** button retrieves Time and Date information from the Master. • The **Set Time/Date** button sets the Master to retain and save any time/date modifications made on the panel.
Time Display fields:	• These fields display the time in three formats: STANDARD, STANDARD AM/PM, and 24 HOUR.
Date Display fields:	• These fields display the calendar date information in several different formats.

Time & Date Settings Page (Cont.)	
Set Date/Time:	Use the UP/DN arrow buttons to adjust the Master's calendar date and time. The blue icon indicates which field is currently selected (see FIG. 47). • **Year** range = 2000 - 2037 • **Month** range = 1 - 12 • **Day** range = 1 - 31 • **Hour** = 24-hour military • **Minute** range = 0 - 59 • **Second** range = 0 - 59

Audio Settings

The MVP-8400i provides an *Audio Settings* page (FIG. 48) with options that allow you to adjust volume levels, set intercom sound and microphone levels, and set panel sounds.

FIG. 48 Audio Adjustments/Volume pages

Features on these pages include:

Audio Settings Page	
Back:	Saves all changes and returns to the previous page.
WiFi/Wired icon:	The icon to the left of the Connection Status Icon displays whether the current connection to the Master is *Wireless* (image of a radio antenna) or *Wired* (image of three networked computers).
Connection Status icon:	The icon in the upper-right corner of each Setup page shows online/offline state of the panel to the master. • Bright red - disconnected • Bright green - connected. Blinks when a blink message is received to dark green every 5 seconds for half a second then go back to bright green. • Bright yellow - panel missed a blink message from the master. It will remain yellow for 3 missed blink messages and then turn red. It will return to green when a blink message is received. ***Note**: a Lock appears on the icon if the panel is connected to a secured NetLinx Master.*

Audio Settings Page (Cont.)	
Master Volume:	This section allows you to alter the current master volume level: • Use the UP/DN buttons to adjust the volume level (range = 0 - 100). • The Master Volume bargraph indicates the current volume level. • The **Mute** button toggles the Mute feature. • Default = 50.
Digital Audio Level:	Adjusts the volume level on the panel's internal speaker: • Use the UP/DN buttons to adjust the volume (range = 0 - 100). • The *Internal Sound Level* bargraph indicates the current sound level. • The **Mute** button mutes the internal speaker volume. • Default = 50.
Panel Sounds:	• Activating the **Button Hit** button plays a default sound when you touch an active button. • Activating the **Button Miss** button plays a default sound when you touch a non-active button or any area outside of the active button. • The **Play Test Sound** button plays a test WAV/MP3 file over the panel's internal speakers. • The **singleBeep01** and **doubleBeep02** buttons play a WAV/MP3 file over the panel's internal speakers of the user's choosing. The panel has several sample files already installed, and custom tones may be added. • Activating the **Panel Docking Tone Enabled** button allows the use of a tone to alert the user that the panel is properly docked in a desk or wall docking station. **NOTE:** If the custom tone files are not already installed on the panel as of the last panel powerup, then the panel must be rebooted for it to recognize the new files.
Intercom Mic Level:	Adjusts the volume level on the panel's microphone. • Use the UP/DN buttons to adjust the microphone level (range = 0 - 100). • The Mic Out Level bargraph indicates the current Mic Out level. • The **Mute** button mutes the Mic volume. • Default = 50.
Intercom Volume:	Sets the volume level for intercom calls. • Use the UP/DN buttons to adjust the Line-In volume level (range = 0 - 100). • The Line-In Level bargraph indicates the current Line-In level. • The **Mute** button mutes the Line-In volume. • Default = 50.

Environmental acoustics, personal voice level and ambient noise are all deciding factors when setting your mic, intercom and panel sound levels. Consider your environment when adjusting intercom and sound levels and use caution so as not to damage the speaker.

WAV files - Supported sample rates

The following sample rates for WAV files are supported by MVP-8400 panels:

Supported WAV Sample Rates	
• 48000 Hz	• 16000 Hz
• 44100 Hz	• 12000 Hz
• 32000 Hz	• 11025 Hz
• 24000 Hz	• 8000 Hz
• 22050 Hz	

Battery Settings

The options on this page allow you to set power warning preferences, monitor battery status information, and adjust the display times for battery warnings. This page is populated with information from MVP-BP batteries in the panel, as well as batteries in a connected MVP-TDS/WDS docking station (FIG. 49).

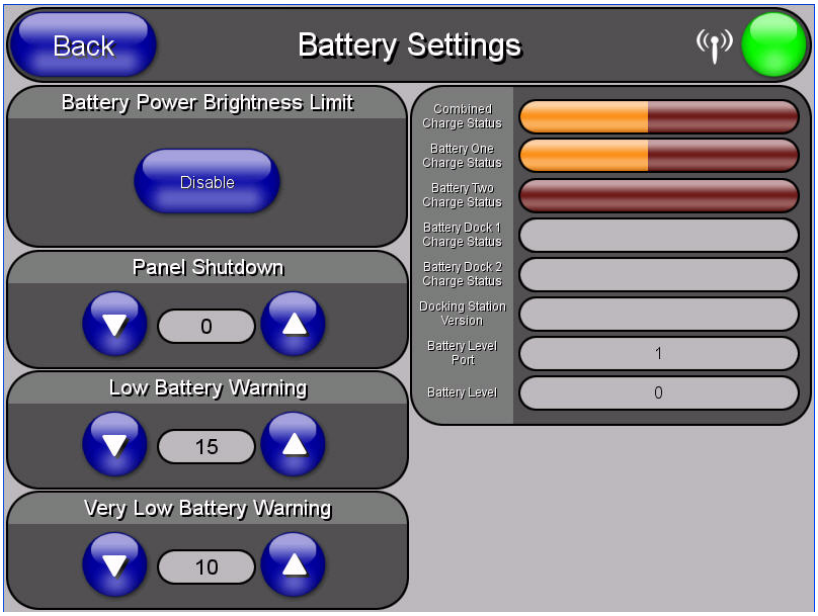


FIG. 49 Battery Settings page

Features on this page include:

Battery Settings Page	
Back:	Saves all changes and returns to the previous page.
WiFi/Wired icon:	The icon to the left of the Connection Status Icon displays whether the current connection to the Master is *Wireless* (image of a radio antenna) or *Wired* (image of three networked computers).
Connection Status icon:	The icon in the upper-right corner of each Setup page shows online/offline state of the panel to the master. • Bright red - disconnected • Bright green - connected. Blinks when a blink message is received to dark green every 5 seconds for half a second then go back to bright green. • Bright yellow - panel missed a blink message from the master. It will remain yellow for 3 missed blink messages and then turn red. It will return to green when a blink message is received. ***Note**: a Lock appears on the icon if the panel is connected to a secured NetLinx Master.*
Battery Power Brightness Limit:	The DISABLE/DISABLED button acts as a power save feature with two options: • **Disable** - activates the brightness limit set on the panel (conserves battery power). Activating this feature causes the panel to function at 80% of full brightness and overrides the Panel Brightness value set on the *Setup* page. • **Disabled** - deactivates this power save feature. The panel will use the Panel Brightness level. ***Note**: This field applies to MVP-BP batteries installed in the panel.*

Battery Settings Page (Cont.)	
Panel Shutdown:	This value determines the number of minutes that would need to pass before the panel automatically shuts-down. Once shutdown, the unit would have to be restarted. The UP/DN buttons alter the timeout value (in minutes). A value of 0 disables this feature. Range = 0, 3, 5, 10, 15, 30, 60, 120, 180, 240 default = 0. ***Note**: This field applies to MVP-BP batteries installed in the panel.*
Low Battery Warning:	The UP/DN buttons adjust the time value (in minutes) available on the battery (for use) before the panel displays a low battery warning. Range - 10, 15, 20, 30, 45 default = 15 min. ***Note**: This field applies to MVP-BP batteries installed in the panel.*
Very Low Battery Warning:	The UP/DN buttons adjust the time value (in minutes) available on the battery before the panel displays a very low battery warning (indicating near-term panel shutdown). • Range = 3, 5, 7, 10 default = 5 min. • This value cannot exceed the Low Battery Warning value. ***Note**: This field applies to MVP-BP batteries installed in the panel.*
Combined Charge Status	Indicates the combined power charge available from batteries installed in the panel. This bar is light blue when connected to a power source, and turns orange and displays the current charge when the panel is running on battery power.
Battery One Charge Status	Indicates the power charge available on the Slot 1 battery in the panel. This bar is light blue when connected to a power source, and turns orange and displays the current charge when the panel is running on battery power.
Battery Two Charge Status	Indicates the power charge available on the Slot 2 battery (in the panel). This bar is light blue when connected to a power source, and turns orange and displays the current charge when the panel is running on battery power. If the panel does not have a Slot 2 battery, this bar will be dark blue, and will turn dark orange when the panel is disconnected from a power source.
Battery Dock 1 Charge Status	Indicates the power charge available on the docking station's battery #1.
Battery Dock 2 Charge Status	Indicates the power charge available on the docking station's battery #2. ***Note**: If no batteries are being charged within the docking station's battery compartments, or the MVP is not connected to a docking station; both Battery Dock Charge Status fields are left blank.*
Docking Station Version	Indicates the firmware version currently installed on the docking station.
Battery Level Port	Indicates the port being used to report charge status levels back to the NetLinx Master (set in TPDesign4).
Battery Level	Indicates the level being used to report status levels back to the NetLinx Master (set in TPDesign4).

Protected Setup Pages

The *Protected Setup* page (FIG. 50) provides secured access to advanced panel configuration options, including communication and security settings.

Enter the factory default password (***1988)*** into the password keypad to access this page.

FIG. 50 Protected Setup page showing default values

Features on the *Protected Setup* page include:

Protected Setup Page	
Back:	Saves all changes and returns to the previous page.
WiFi/Wired icon:	The icon to the left of the Connection Status Icon displays whether the current connection to the Master is *Wireless* (image of a radio antenna) or *Wired* (image of three networked computers).
Connection Status icon:	The icon in the upper-right corner of each Setup page shows online/offline state of the panel to the master. • Bright red - disconnected • Bright green - connected. Blinks when a blink message is received to dark green every 5 seconds for half a second then go back to bright green. • Bright yellow - panel missed a blink message from the master. It will remain yellow for 3 missed blink messages and then turn red. It will return to green when a blink message is received. ***Note**: a Lock appears on the icon if the panel is connected to a secured NetLinx Master.*
Navigation Buttons:	The buttons along on the left side of the page provide access to secondary Protected Setup pages (see following sections).

Protected Setup Page (Cont.)	
Device Information	The fields and buttons in this section control the device name and number information. • **Device Number** - opens a keypad used to view/set the device number of the panel. • **Device Name** - Opens a keypad used to view/set the device name of the panel • **Synchronize Panel Names** - Synchronizes the Device Name, IP Hostname, and G4 Web Control Name. When synchronizing other names to the Device Name, this opens a Confirmation Dialogue asking "Are you sure you want to do this?" - Pressing **Yes** synchronizes the names. - Pressing **No** returns you to the *Protected Setup* page.
Docking Station:	• **Dock Status** - illuminates when the MVP is docked and communicating with the Docking Station. • **Undock Panel** - forces the docking station to release the MVP without requiring a User Access username or password. • **Disable Docking Station LED** - disables the display of the LEDs on the docking station.
Options:	• **Function Show** - toggles the display of the channel port, channel code, level port and level code on all touch panel buttons (see FIG. 51). • **Telnet** - enables/disables the panel's telnet server (to allow direct telnet communication to the panel). • **Page Tracking** - toggles the page tracking function. When enabled, the panel reports page data to the NetLinx Master. • **Front Button Setup Access** - activates the two lower buttons on the front of the panel for accessing the Setup and Calibration pages (see FIG. 41 on page 41). The default setting is On. **-** Press and hold these buttons for **3 seconds** to access the Setup page. - Press and hold these buttons for **6 seconds** to access the Calibration page. • **Standard Security** - This button is blocked out.
System Recovery:	• **Remove User Pages** - allows you remove all TPD4 touch panel pages currently on the panel, including the pre-installed AMX Demo pages. This option invokes a Confirmation dialog, prompting you to confirm your selection before removing the panel pages. Note that the **YES** button on the Confirmation dialog is disabled for 5 seconds as additional protection against accidentally resetting the panel or removing the panel pages. • **Reset System Settings** - deletes all of the current configuration parameters on the panel (including IP Addresses, Device Number assignments, Passwords, and other presets). This option invokes a Confirmation dialog, prompting you to confirm your selection before resetting the panel.
Reboot / Shutdown:	• **Reboot** - pressing this button causes the panel to reboot after saving any changes. • **Shutdown** - This button will shut down the panel entirely, requiring a manual restart. This button is disabled when the panel is connected to a power source such as a docking station, and will only be enabled when running on battery power.

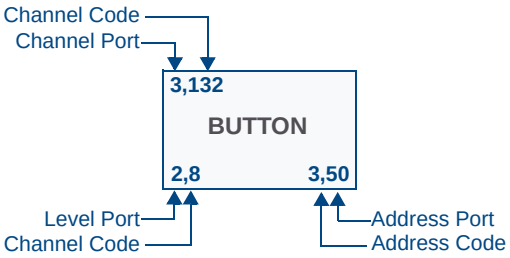


FIG. 51 Function Show example

Protected Setup Navigation Buttons

The Protected Setup Navigation Buttons (FIG. 52) appear on the left of the panel screen when the Protected Setup page is currently active.

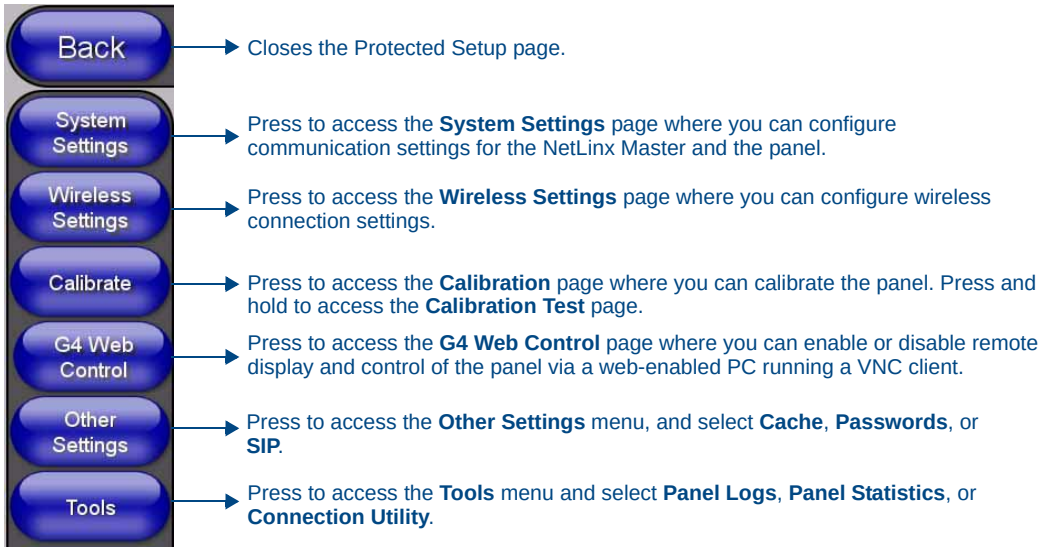

Back
System Settings
Wireless Settings
Calibrate
G4 Web Control
Other Settings
Tools
Closes the Protected Setup page.
Press to access the System Settings page where you can configure communication settings for the NetLinx Master and the panel.
Press to access the Wireless Settings page where you can configure wireless connection settings.
Press to access the Calibration page where you can calibrate the panel. Press and hold to access the Calibration Test page.
Press to access the G4 Web Control page where you can enable or disable remote display and control of the panel via a web-enabled PC running a VNC client.
Press to access the Other Settings menu, and select Cache, Passwords, or SIP.
Press to access the Tools menu and select Panel Logs, Panel Statistics, or Connection Utility.

FIG. 52 Protected Setup Navigation Buttons

System Settings Page

The *System Settings* page (FIG. 53) displays sets the NetLinx Master's communication settings.

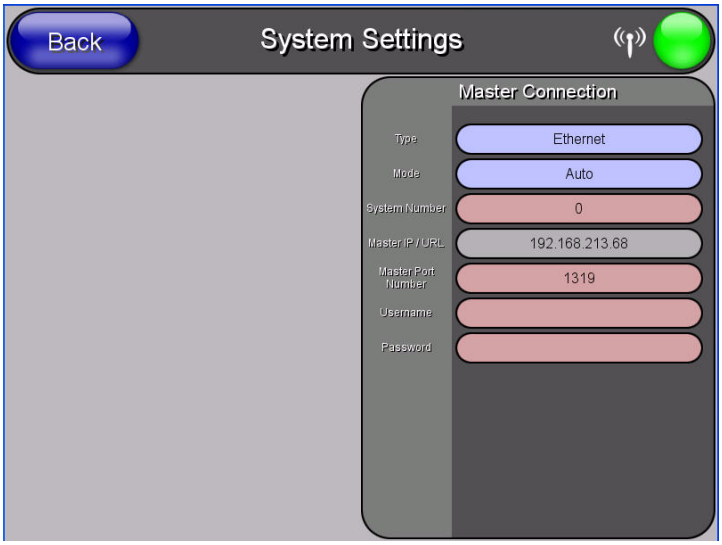


FIG. 53 System Settings page

The elements of this page include:

System Settings Page Elements	
Back:	Saves all changes and returns to the previous page.
WiFi/Wired icon:	The icon to the left of the Connection Status Icon displays whether the current connection to the Master is *Wireless* (image of a radio antenna) or *Wired* (image of three networked computers).
Connection Status icon:	The icon in the upper-right corner of each Setup page shows online/offline state of the panel to the master. • Bright red - disconnected • Bright green - connected. Blinks when a blink message is received to dark green every 5 seconds for half a second then go back to bright green. • Bright yellow - panel missed a blink message from the master. It will remain yellow for 3 missed blink messages and then turn red. It will return to green when a blink message is received. ***Note**: a Lock appears on the icon if the panel is connected to a secured NetLinx Master.*
Master Connection:	Sets the NetLinx Master communication values:
Type	Sets the NetLinx Master to communicate with the panel via either USB or Ethernet. This is based on the cable connection from the rear. ***Note**: ICSNet is not a supported option on this panel.* • *Ethernet* is a CAT-5 cable (10/100Base T terminated in an RJ-45 connector) used to network computers together and is used in most LAN (local area networks). This description is also used to refer to both wired and wireless communication. • *USB* option cannot be used on Modero panels that are not equipped with a rear USB port.

System Settings Page Elements	
Master Connection (Cont.):	
Mode	Cycles between the connection modes: URL, Listen, and Auto. *(Ethernet Only - disabled when USB is selected)* • **URL** - In this mode, enter the IP/URL, Master Port Number, and username/password (if used) on the Master. The System Number field is read-only - the panel obtains this information from the Master. • **Listen** - In this mode, add the panel address into the URL List in NetLinx Studio and set the connection mode to Listen. This mode allows the Modero touch panel to “listen” for the Master’s communication signals. The System Number and Master IP/URL fields are read-only. • **Auto** - In this mode, enter the System Number and a username/password (if applicable). Use this mode when both the panel and the NetLinx Master are on the same Subnet, and the Master has its UDP feature enabled. The Master IP/URL field is read-only.
System Number	Allows you to enter a system number. Default value is 0 (zero). *(ETHERNET Only - disabled when USB is selected)*
Master IP/URL	Sets the Master IP or URL of the NetLinx Master. *(ETHERNET Only - disabled when USB is selected)*
Master Port Number	Allows you to enter the port number used with the NetLinx Master. • Default = 1319 *(ETHERNET Only - disabled when USB is selected)*
Username/Password	If the target Master has been previously secured, enter the alpha-numeric string (into each field) assigned to a pre-configured user profile on the Master. This profile should have the pre-defined level of access/configuration rights.

Refer to the *Step 3: Choose a Master Connection Mode* section on page 24 for more detailed information on using the *System Settings* page.

Wireless Settings Page

Use the options on the Wireless Settings page (FIG. 54) to configure communication settings for the wireless CF card (802.11g), and read the device number assigned to the panel.

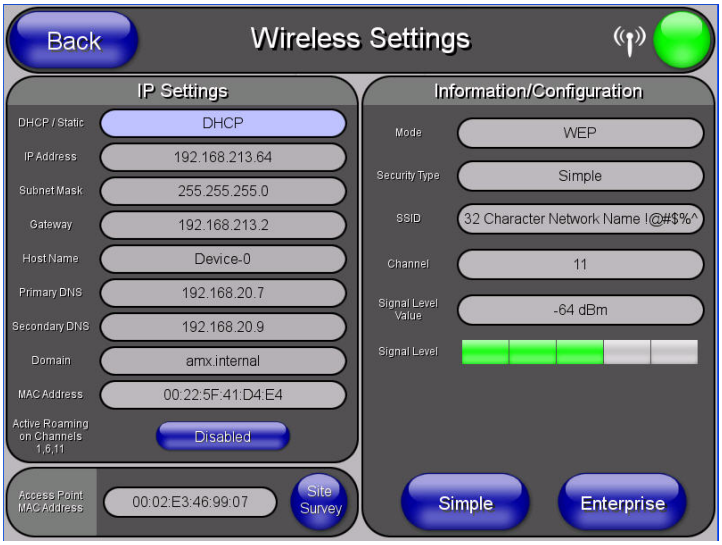


FIG. 54 Wireless Settings page (reads from and assigns values to the WAP)

Features on this page include:

Wireless Settings Page	
Back:	Saves all changes and returns to the previous page.
WiFi/Wired icon:	The icon to the left of the Connection Status Icon displays whether the current connection to the Master is *Wireless* (image of a radio antenna) or *Wired* (image of three networked computers).
Connection Status icon:	The icon in the upper-right corner of each Setup page shows online/offline state of the panel to the master. • Bright red - disconnected • Bright green - connected. Blinks when a blink message is received to dark green every 5 seconds for half a second then go back to bright green. • Bright yellow - panel missed a blink message from the master. It will remain yellow for 3 missed blink messages and then turn red. It will return to green when a blink message is received. ***Note**: a Lock appears on the icon if the panel is connected to a secured NetLinx Master.*
IP Settings:	Sets the IP communication values for the panel:
DHCP/STATIC	Sets the panel to either DHCP or Static communication modes. • *DHCP* - a temporary IP Addresses is assigned to the panel by a DHCP server. • *Static IP* is a permanent IP Address assigned to the panel. If Static IP is selected, the other *IP Settings* fields are enabled (below).
IP Address	Enter the secondary IP address for this panel.
Subnet Mask	Enter the subnetwork address for this panel.
Gateway	Enter the gateway address for this panel.
Host Name	Enter the host name for this panel.
Primary DNS	Enter the address of the primary DNS server used by this panel for host name lookups.
Secondary DNS	Enter the secondary DNS address for this panel.
Domain	Enter a unique name to the panel for DNS look-up.

Wireless Settings Page (Cont.)	
IP Settings (Cont.):	
MAC Address	This unique address identifies the wireless Ethernet card in the panel (read-only).
Active Roaming on Channels 1,6,11	When enabled, the device is actively roaming on the channels 1, 6, and 11. By default, Active Roaming is disabled. Of all the frequency channels that are assigned for wireless, only three are non-overlapping frequencies that do not interfere with each other. Non-overlapping channels avoid the interference that can affect the signal.
Access Point MAC Address:	This unique address identifies the Wireless Access Point (WAP) used by this panel for wireless communication (read-only). • **Site Survey** button: Launches the Site Survey page. The options on this page allow you to detect ("sniff-out") all WAPs transmitting within range of the panel's *NXA-WC80211GCF* Wi-Fi card. Data displayed on the *Site Survey* page is categorized by: - **Network Name (SSID**) - WAP names - **Channel (RF)** - channels currently being used by the WAP - **Security Type** - security protocol enabled on the WAP, if detectable - **Signal Strength** - None, Poor, Fair, Good, Very Good, and Excellent - **MAC Address** - Unique identification of the transmitting Access Point • Refer to the *Using the Site Survey tool* section on page 18 for more detailed information on the *SIte Survey* page. • When communicating with a NXA- WAP200G, enter the MAC Address (**BSSID**) of the target WAP as the Access Point MAC Address. Refer to the ***WAP200G*** *Instruction Manual* for more information.
Information/Configuration:	• **Mode -** Displays the current Security Type selected via either the Simple or Enterprise options. • **Security Type -** Displays whether the currently used security type is *Simple* or *Enterprise*. • **SSID -** Displays the currently used SSID of the target WAP. • **Channel -** The RF channel being used for connection to the WAP (read-only). • **Signal Level Value -** Displays the quality of the link from the wireless NIC to the Wireless Access Point (direct sequence spread spectrum) in real time (*None*, *Poor*, *Fair*, *Good*, *Very Good*, and *Excellent*).Even when link quality is at its lowest you still have a connection, and the ability to transmit and receive data, even if at lower speeds. ***Note:*** *"Signal Level Value" and "Signal Level" are applicable to RF connections only. It is possible to have an RF signal to a WAP, but be unable to communicate with it because of either incorrect IP or encryption settings.* • **Signal Level -** This bar graph demonstrates the strength of the current signal.
Simple/Enterprise:	• Opens either the Wireless Security: Simple Mode or the Wireless Security: Enterprise Mode windows.

Pressing the **Simple** or **Enterprise** buttons at the bottom of the *Information/Configuration* section open an appropriate Wireless Security window for Simple Mode or Enterprise Mode. Simple Mode is best used for smaller installations that use a single Master, such as for residences or smaller office environments. Enterprise Mode is intended for installations that use multiple Masters, where a wireless device may need to switch between multiple wireless access points connected to different Masters in a network.

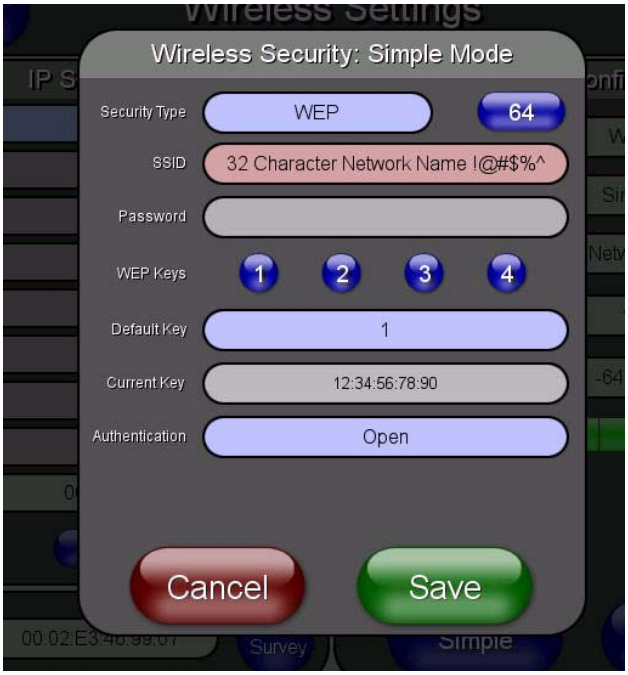


FIG. 55 Wireless Security: Simple Mode

Wireless Security: Simple Mode	
Security Type:	This field may be switched between WEP, WPA-PSK, and Open. If WEP is selected, the button to the right may be switched between *64* and *128*. • **WEP** security requires that both a target WAP be identified and an encryption method be implemented prior to establishing communication. (Refer to the *WEP Settings* section on page 62 for further details.) • **WPA-PSK** security is designed for environments where is it desirable to use WPA or WPA2, but an *802.1x authentication server is not available*. PSK connections are more secure than WEP and are simpler to configure since they implement dynamic keys but share a key between the WAP and the panel (client). (Refer to the *WPA-PSK Settings* section on page 64 for further details.) • **Open** security does not utilize any encryption methodology, but requires an SSID (alpha-numeric) entry. This entry must match the Network Name (SSID) entry of the target WAP so the panel knows what device it is using to communicate with the network. (Refer to the following *Open Settings* section on page 62 for further details.)
SSID:	Press this field to enter a 32-character Network Name in the *Network Name* keypad.
Password:	This field is only enabled when *WPA-PSK* is selected as the Security Type. Clicking this field opens the *Password/Pass Phrase* keyboard
WEP Keys:	These buttons are only enabled when *WEP* is selected as the Security Type. Press each one to open a keyboard to enter a 10-digit WEP Key.
Default Key:	This field is only enabled when WEP is selected as the Security Type. Press the field to select which of the four WEP Keys is the default.
Current Key:	This field is only populated when WEP is selected as the Security Type.
Authentication:	This field is only enabled when WEP is selected as the Security Type. Press the field to select between *Shared* and *Open*.
Cancel/Save:	Press **Cancel** to return to the *Wireless Settings* page without saving any changes. Press **Save** to save all changes and return to the *Wireless Settings* page.

FIG. 56 Wireless Security: Enterprise Mode

Wireless Security: Enterprise Mode	
Security Type:	Pressing this field changes the security type being used between EAP-PEAP, EAP-TTLS, EAP-TLS, EAP-LEAP, and EAP-FAST. • **EAP-PEAP** security is designed for wireless environments where it is necessary to securely transmit data over a wireless network. (Refer to the *EAP-PEAP Settings* section on page 67 for details. For information on uploading a certificate file, refer to the *AMX Certificate Upload Utility* section on page 167.) • **EAP-TTLS** security is designed for wireless environments where it is necessary to first have a Radius server directly validate the identity of the client (panel) before allowing it access to the network. (Refer to the *EAP-TTLS Settings* section on page 68 for details. For information on uploading a certificate file, refer to the *AMX Certificate Upload Utility* section on page 167.) • **EAP-TLS** security is designed for wireless environments where it is necessary to securely transmit data over a wireless network by adding an additional level of security protocol via the use of a private key. (Refer to the *EAP-TLS Settings* section on page 70 for details. For information on uploading a certificate file, refer to the *AMX Certificate Upload Utility* section on page 167.) • **EAP-LEAP** security is designed for wireless environments where it is not required to have both a client or server certificate validation scheme in place, yet necessary to securely transmit data over a wireless network. (Refer to the *EAP-LEAP Settings* section on page 65 for details.) • **EAP-FAST** security is designed for wireless environments where security and ease of setup are equally desirable. (Refer to the *EAP-FAST Settings* section on page 66 for details.)
SSID:	Press this field to enter a 32-character Network Name in the *Network Name* keypad.
Identity:	Press this field to enter a Username in the *Identity (Username)* keypad.
Anon. Identity:	This field is only enabled when selecting EAP-TTLS and EAP-FAST as a Security Type. Press this field to enter another Username in the *Anonymous Identity* keypad.

Wireless Security: Enterprise Mode (Cont.)	
Password:	Press this field to enter a password for wireless access in the *Password* keypad. (**NOTE:** this field is greyed out when selecting EAP-TLS as a Security Type.)
Certificate Authority:	Press this field to enter the file location for a Certificate Authority certificate in the *Certificate Authority (CA)* keypad.
PEAP Version:	This field is only enabled when selecting EAP-PEAP as a Security Type. Press this field to cycle between the available installed versions of PEAP.
Inner Auth. Type:	This field is only enabled when selecting EAP-PEAP or EAP-TTLS as a Security Type. Press this field to cycle between MSCHAPv2, GTC, OTP, and MD5.
Client Certificate:	This field is only enabled when selecting EAP-TLS as a Security Type. Press this field to enter a file location in the Client Certificate File Location keypad.
Private key:	This field is only enabled when selecting EAP-TLS as a Security Type. Press this field to enter a file location in the *Client Private Key File Location* keypad.
Private Key Password:	This field is only enabled when selecting EAP-TLS as a Security Type. Press this field to enter the password for the private key in the *Private Key Password* keypad.
Auto PAC Provisioning:	This field is only enabled when selecting EAP-FAST as a Security Type. Press this field to enable or disable the use of PAC files.
PAC File Location:	This field is only enabled when selecting EAP-FAST as a Security Type, and only when Auto PAC Provisioning is Disabled. Press this field to enter a file location in the *PAC File Location* keypad.
Auto Key Renewal:	This field is blocked out, but will read "NEVER" when selecting EAP-FAST as a Security Type.
Cancel/Save:	Press the **Cancel** button to return to the *Wireless Settings* Page without saving any changes. Press the **Save** button to save all changes and return to the *Wireless Settings* Page.

Wireless Settings

The options on the *Wireless Security: Simple Mode* and *Wireless Security: Enterprise Mode* windows allow you to select from the wireless security methods supported by the NXA-WC80211GCF Wi-Fi card. These security methods incorporate *WPA*, *WPA2*, and *EAP* technology (some of which require the upload of unique certificate files to a target panel).

Refer to the *Appendix B - Wireless Technology* section on page 163 for more further information.

Some encryption and security features may/may not be supported depending on the type of wireless card being used:

Wireless Security Support	
802.11g Wi-Fi CF card:	• Open (Clear Text) • Static WEP (64-bit and 128-bit key lengths) • WPA-PSK • EAP security (with and without certificates) • WAP SIte Survey

Refer to the *Configuring a Wireless Network Access* section on page 14 for more information on configuring the panel for wireless network access using the various security options.

Open Settings

Open security does not utilize any encryption methodology, but requires an SSID (alpha-numeric) entry. This entry must match the Network Name (SSID) entry of the target WAP so the panel knows what device it is using to communicate with the network.

Open Settings	
SSID (Service Set Identifier):	Opens an on-screen keyboard to enter the SSID name used on the target WAP. The SSID is a unique name used by the WAP, and is assigned to all panels on that network. An SSID is required by the WAP before the panel is permitted to join the network. • The SSID is case sensitive and must not exceed 32 characters. • Make sure this setting is the same for all points in your wireless network. • NXA-WAP200Gs use **AMX** as their default SSID. • If this field is left blank, the panel will attempt to connect to the first available WAP.
Save/Cancel:	• **Save** - store the new security information, apply changes, and return to the previous page. • **Cancel** - discard changes and return to the previous page.

- Refer to the *Configuring a Wireless Network Access* section on page 14 for further details on these security options.
- Refer to the *Using the Site Survey tool* section on page 18.

WEP Settings

WEP security requires that both a target WAP be identified and an encryption method be implemented prior to establishing communication. In addition to providing both Open and Shared Authentication capabilities, this page also supports Hexadecimal and ASCII keys.

WEP Settings	
SSID (Service Set Identifier):	Opens an on-screen keyboard to enter the SSID name used on the target WAP. The SSID is a unique name used by the WAP, and is assigned to all panels on that network. An SSID is required by the WAP before the panel is permitted to join the network. • The SSID is case sensitive and must not exceed 32 characters. • Make sure this setting is the same for all points in your wireless network. • NXA-WAP200Gs use **AMX** as their default SSID. • If this field is left blank, the panel will attempt to connect to the first available WAP.
WEP 64 / WEP 128:	Cycles through the available encryption options: *64 or 128 Bit Key Size*. "WEP" (Wired Equivalent Privacy) is an 802.11 security protocol designed to provide wireless security equivalent to wired networks. • **WEP64** enables WEP encryption using a 64 Bit Key Size. All packets are transmitted with their contents encrypted using the Default WEP Key. • **WEP128** enables WEP encryption using a 128 Bit Key Size. All packets are transmitted with their contents encrypted using the Default WEP Key. • If the key is not the correct size, the system will resize it to match the number of bits required for the WEP encryption mode selected.

WEP Settings (Cont.)	
Generate (Passphrase):	This button displays an on-screen keyboard which allows you to enter a passphrase. The panel then automatically generates four WEP keys (compatible only with Modero panels). Enter these WEP keys into the target WAP. When working with multiple panels, WEP Keys must be entered into the WAP for each panel. • All Modero panels use the same code key generator. Therefore, this Passphrase generates identical keys on any Modero panel. • The Passphrase generator is case sensitive. ***Note**: This Key generator is unique to Modero panels and does not generate the same keys as non-AMX wireless devices. For example, a Current Key string generated anywhere else will not match those created on Modero panels.*
Default Key:	Cycles through the four available WEP key identifiers to select a WEP key to use. As the Default Key value is altered (through selection) the corresponding "Current Key" is displayed. Each Current Key corresponds to a WEP key. This feature is useful for accessing different networks without having to reenter that networks' WEP key. It is also sometimes used to set up a rotating key schedule to provide an extra layer of security.
WEP Keys:	This feature provides another level of security by selecting up to four WEP Keys. Push any of the four buttons to open an on-screen keyboard. Both ASCII and HEX keys are supported. Up to four keys can be configured for both. • An ASCII key utilizes either 5 or 13 ASCII characters • A HEX key utilizes either 10 or 26 Hexidecimal characters Press **Done** to accept any changes and save the new value. ***Note**: A 64-bit key will be 10 characters in length while a 128-bit key will be 26 characters in length. The length of the key entered determines the level of WEP encryption employed (64 or 128-bit). 128-bit keys may be used if supported by the internal wireless card.*
Current Key:	Displays the current WEP key in use. • When working with a single panel and a single WAP, it is recommended that you manually enter the *Current Key* from the WAP into the selected WEP Key. • When working with a single WAP and multiple panels, it is recommended that you generate a Current Key using the same passphrase on all panels and then enter the panel-produced WEP key manually into the Wireless Access Point. • Keys may also be examined by touching the key buttons and noting the keyboard initialization text. • Use the on-screen keyboard's **Clear** button to erase stored key information.
Authentication:	Toggles between the two authentication modes: *Open + WEP* (broadcast publicly) or *Shared + WEP* (encrypted). • An *Open + WEP* network allows connections from any client without authentication. • A *Shared + WEP* network requires the client to submit a key which is shared by the network WAP before it is given permission to associate with the network. In this case the key is the same as the WEP encryption key. In either case, if WEP encryption has been enabled, the client will still require the WEP key to encrypt and decrypt packets in order to communicate with the network.
Save/Cancel:	• **Save** - store the new security information, apply changes, and return to the previous page. • **Cancel** - discard changes and return to the previous page.

- Refer to the *Configuring a Wireless Network Access* section on page 14 for further details on these security options.
- Refer to the *Using the Site Survey tool* section on page 18 for more information on using this feature.

WPA-PSK Settings

WPA-PSK security is designed for environments where is it desirable to use WPA or WPA2, but an 802.1x authentication server is not available. PSK connections are more secure than WEP and are simpler to configure since they implement dynamic keys but share a key between the WAP and the panel (client).

Using WPA-PSK, the encryption on the WAP could either be WPA or WPA2. The firmware in the panel will automatically connect to the WAP using the correct encryption. The WPA encryption type is configured on the WAP, not in the firmware.

WAPs do not display “WPA” or “WPA2” on their configuration screens:

- *WPA* is normally displayed as *TKIP*.
- *WPA2* is normally displayed as *AES CCMP*.

The following fields are required: *SSID* and *Password/Pass Phrase*.

- Enter the SSID of the WAP.
- Enter a pass phrase with a minimum of 8 characters and a maximum of 63.
- The exact same pass phrase (including capitalization) must be entered in the access point.

WPA-PSK Settings	
SSID (Service Set Identifier):	Opens an on-screen keyboard to enter the SSID name used on the target WAP. The SSID is a unique name used by the WAP, and is assigned to all panels on that network. An SSID is required by the WAP before the panel is permitted to join the network. • The SSID is case sensitive and must not exceed 32 characters. • Make sure this setting is the same for all points in your wireless network. • NXA-WAP200Gs use **AMX** as their default SSID. • If this field is left blank, the panel will attempt to connect to the first available WAP.
Password:	Opens an on-screen keyboard to enter a passphrase (password). • This alpha-numeric string must use a minimum of 8 characters and a maximum of 63. • The exact pass phrase string (including capitalization) must be entered on the target WAP.
Save/Cancel:	• **Save** - store the new security information, apply changes, and return to the previous page. • **Cancel** - discard changes and return to the previous page.

- Refer to the *Configuring a Wireless Network Access* section on page 14 for details on these security options.
- Refer to the *Using the Site Survey tool* section on page 18 for more information on using this tool.

EAP-LEAP Settings

EAP (Extensible Authentication Protocol) is an Enterprise authentication protocol that can be used in both wired and wireless network environments. EAP requires the use of an 802.1x Authentication Server, also known as a Radius server. The configuration fields described below take variable length strings as inputs. An on-screen keyboard is opened when these fields are selected.

LEAP (Lightweight Extensible Authentication Protocol) was developed to transmit authentication information securely in a wireless network environment.

LEAP does not use client (panel) or server (RADIUS) certificates and is therefore one of the least secure EAP security methods but can be utilized successfully by implementing sufficiently complex passwords.

EAP-LEAP security is designed for wireless environments where it is not required to have a client or server certificate validation scheme in place, yet necessary to transmit data securely over a wireless network.

EAP-LEAP Settings	
SSID (Service Set Identifier):	Opens an on-screen keyboard to enter the SSID name used on the target WAP. The SSID is a unique name used by the WAP, and is assigned to all panels on that network. An SSID is required by the WAP before the panel is permitted to join the network. • The SSID is case sensitive and must not exceed 32 characters. • Make sure this setting is the same for all points in your wireless network. • NXA-WAP200Gs use **AMX** as their default SSID. • With EAP security, the SSID of the WAP *must* be entered. If it is left blank, the panel will try to connect to the first access point detected that supports EAP. However, a successful connection is not guaranteed because the detected WAP may be connected to a RADIUS server, which may not support this EAP type and/or have the proper user identities configured.
Identity:	Opens an on-screen keyboard. Enter an EAP Identity string (used by the panel to identify itself to an Authentication (RADIUS) Server). ***Note**: This information is similar to a username used to login to a secured server or workstation. This works in tandem with the Password string which is similar to the password entered to gain access to a secured workstation. Typically, this is in the form of a username such as: jdoe@amx.com.*
Password:	Opens an on-screen keyboard. Enter the network password string specified for the user entered within the *Identity* field (used by the panel to identify itself to an Authentication (RADIUS) Server) ***Note**: This information is similar to the password entered to gain access to a secured workstation.*
Save/Cancel:	• **Save** - store the new security information, apply changes, and return to the previous page. • **Cancel** - discard changes and return to the previous page.

EAP-FAST Settings

EAP-FAST (Flexible Authentication via Secure Tunneling) security was designed for wireless environments where security and ease of setup are equally desirable. EAP-FAST uses a certificate file, however it can be configured to download the certificate automatically the first time the panel attempts to authenticate itself. Automatic certificate downloading is convenient but slightly less secure, since its the certificate is transferred wirelessly and could theoretically be "sniffed-out".

EAP-FAST Settings	
SSID (Service Set Identifier):	Opens an on-screen keyboard to enter the SSID name used on the target WAP. The SSID is a unique name used by the WAP, and is assigned to all panels on that network. An SSID is required by the WAP before the panel is permitted to join the network. • The SSID is case sensitive and must not exceed 32 characters. • Make sure this setting is the same for all points in your wireless network. • NXA-WAP200Gs use **AMX** as their default SSID. • With EAP security, the SSID of the WAP *must* be entered. If it is left blank, the panel will try to connect to the first access point detected that supports EAP. However, a successful connection is not guaranteed because the detected WAP may be connected to a RADIUS server, which may not support this EAP type and/or have the proper user identities configured.
Identity:	Opens an on-screen keyboard. Enter an EAP Identity string (used by the panel to identify itself to an Authentication (RADIUS) Server). ***Note**: This information is similar to a username used to login to a secured server or workstation. This works in tandem with the Password string which is similar to the password entered to gain access to a secured workstation. Typically, this is in the form of a username such as: jdoe@amx.com.*
Anonymous Identity:	Opens an on-screen keyboard. Enter an IT provided alpha-numeric string which (similar to the username) used as the identity, but that does not represent a real user. This information is used as a fictitious name which might be seen by sniffer programs during the initial connection and setup process between the panel and the Radius server. In this way the real identity (username) is protected. Typically, this is in the form of a fictitious username such as: anonymous@amx.com
Password:	Opens an on-screen keyboard. Enter the network password string specified for the user entered within the *Identity* field (used by the panel to identify itself to an Authentication (RADIUS) Server) ***Note**: This information is similar to the password entered to gain access to a secured workstation.*
Automatic PAC Provisioning:	This selection toggles PAC (Protected Access Credential) Provisioning - **Enabled** *(automatic)* or **Disabled** *(manual)*. • If **Enabled** is selected, the following *PAC File Location* field is disabled, because the search for the PAC file is done automatically. • If **Disabled** is selected, the user is required to manually locate a file containing the PAC shared secret credentials for use in authentication. In this case, the IT department must create a PAC file and then transfer it into the panel using the *AMX Certificate Upload* application. Note: Even when automatic provisioning is enabled, the PAC certificate is only downloaded the first time that the panel connects to the RADIUS server. This file is then saved into the panel's file system and is then reused from then on. It is possible for the user to change a setting (such as a new Identity) that would invalidate this certificate. In that case, the panel must be forced to download a new PAC file. To do this, set Automatic PAC Provisioning to *Disabled* and then back to *Enabled*. This forces the firmware to delete the old file and request a new one.

EAP-FAST Settings (Cont.)	
PAC File Location:	This field is used when the previous Automatic PAC Provisioning option has been **Disabled**. • When pressed, the panel displays an on-screen PAC File Location keyboard which allows you to enter the name of the file containing the PAC shared secret credentials for use in authentication. • This field is only valid when the automatic PAC provisioning feature has been enabled via the previous field.
Save/Cancel:	• **Save** - store the new security information, apply changes, and return to the previous page. • **Cancel** - discard changes and return to the previous page.

- Refer to the *EAP Authentication* section on page 166 for further details on these security options.
- Refer to the *Using the Site Survey tool* section on page 18 for more information on using this feature.

EAP-PEAP Settings

PEAP (Protected Extensible Authentication Protocol) was developed as a way to securely transmit authentication information, such as passwords, over a wireless network environment. PEAP uses only server-side public key certificates and therefore does not need a client (panel) certificate which makes the configuration and setup easier.

There are two main versions of the PEAP protocol supported by panel's DeviceScape Wireless Client:

- PEAPv0
- PEAPv1

PEAP uses inner authentication mechanisms supported by the DeviceScape Wireless Client, the most common of which are:

- MSCHAPv2 with PEAPv0
- GTC with PEAPv1

EAP-PEAP security is designed for wireless environments where it is necessary to transmit data securely over a wireless network.

EAP-PEAP Settings	
SSID (Service Set Identifier):	Opens an on-screen keyboard to enter the SSID name used on the target WAP. The SSID is a unique name used by the WAP, and is assigned to all panels on that network. An SSID is required by the WAP before the panel is permitted to join the network. • The SSID is case sensitive and must not exceed 32 characters. • Make sure this setting is the same for all points in your wireless network. • NXA-WAP200Gs use **AMX** as their default SSID. • With EAP security, the SSID of the WAP *must* be entered. If it is left blank, the panel will try to connect to the first access point detected that supports EAP. However, a successful connection is not guaranteed because the detected WAP may be connected to a RADIUS server, which may not support this EAP type and/or have the proper user identities configured.
Identity:	Opens an on-screen keyboard. Enter an EAP Identity string (used by the panel to identify itself to an Authentication (RADIUS) Server). ***Note**: This information is similar to a username used to login to a secured server or workstation. This works in tandem with the Password string which is similar to the password entered to gain access to a secured workstation. Typically, this is in the form of a username such as: jdoe@amx.com.*
Password:	Opens an on-screen keyboard. Enter the network password string specified for the user entered within the *Identity* field (used by the panel to identify itself to an Authentication (RADIUS) Server) ***Note**: This information is similar to the password entered to gain access to a secured workstation.*

EAP-PEAP Settings (Cont.)	
Certificate Authority:	When pressed, the panel displays an on-screen Certificate Authority (CA) File Location keyboard which allows you to enter the name of the certificate authority file which is used to validate the server certificate. This field is optional. If a server certificate is used, it should first be downloaded into the panel and the *Certificate Authority* field should then be set to the name of that certificate file. No file path should be used for this setting as all certificates are stored in a specific directory that the user cannot control or change. • Use the on-screen keyboard's **Clear** button to completely erase any previously stored network path information.
PEAP Version:	When pressed, this field cycles through the choices of available PEAP: **PEAPv0, PEAPv1,** or **PEAPv1 w/peaplabel=1**.
Inner Authentication Type:	When pressed, this field cycles through the choices of available Inner Authentication mechanisms supported by the Devicescape Secure Wireless Client. The most commonly used are: **MSCHAPv2** and **GTC**. • MSCHAPv2 (*used with PEAPv0*) • TLS • GTC (*used with PEAPv1*) • OTP • MD5-Challenge
Save/Cancel:	• **Save** - store the new security information, apply changes, and return to the previous page. • **Cancel** - discard changes and return to the previous page.

- Refer to the *EAP Authentication* section on page 166 for further details on these security options.
- Refer to the *Using the Site Survey tool* section on page 18 for more information on using this feature.

EAP-TTLS Settings

TTLS (EAP Tunneled Transport Layer Security) is an authentication method that does not use a client certificate to authenticate the panel. However. this method is more secure than PEAP because it does not broadcast the identity of the user. Setup is similar to PEAP, but differs in the following areas:

- An anonymous identity must be specified until the secure tunnel between the panel and the Radius server is setup to transfer the real identity of the user.
- There is no end-user ability to select from the different types of PEAP.
- Additional Inner Authentication choices are available to the end-user.

EAP-TTLS security is designed for wireless environments where it is necessary to have the Radius server directly validate the identity of the client (panel) before allowing it access to the network. This validation is done by tunneling a connection through the WAP and directly between the panel and the Radius server. Once the client is identified and then validated, the Radius server disconnects the tunnel and allows the panel to access the network directly via the target WAP.

EAP-TTLS Settings	
SSID (Service Set Identifier):	Opens an on-screen keyboard to enter the SSID name used on the target WAP. The SSID is a unique name used by the WAP, and is assigned to all panels on that network. An SSID is required by the WAP before the panel is permitted to join the network. • The SSID is case sensitive and must not exceed 32 characters. • Make sure this setting is the same for all points in your wireless network. • NXA-WAP200Gs use **AMX** as their default SSID. • With EAP security, the SSID of the WAP *must* be entered. If it is left blank, the panel will try to connect to the first access point detected that supports EAP. However, a successful connection is not guaranteed because the detected WAP may be connected to a RADIUS server, which may not support this EAP type and/or have the proper user identities configured.

EAP-TTLS Settings (Cont.)	
Identity:	Opens an on-screen keyboard. Enter an EAP Identity string (used by the panel to identify itself to an Authentication (RADIUS) Server). ***Note**: This information is similar to a username used to login to a secured server or workstation. This works in tandem with the Password string which is similar to the password entered to gain access to a secured workstation. Typically, this is in the form of a username such as: jdoe@amx.com.*
Anonymous Identity:	Opens an on-screen keyboard. Enter an IT provided alpha-numeric string which (similar to the username) used as the identity, but that does not represent a real user. This information is used as a fictitious name which might be seen by sniffer programs during the initial connection and setup process between the panel and the Radius server. In this way the real identity (username) is protected. Typically, this is in the form of a fictitious username such as: anonymous@amx.com
Password:	Opens an on-screen keyboard. Enter the network password string specified for the user entered within the *Identity* field (used by the panel to identify itself to an Authentication (RADIUS) Server) ***Note**: This information is similar to the password entered to gain access to a secured workstation.*
Certificate Authority:	When pressed, the panel displays an on-screen Certificate Authority (CA) File Location keyboard which allows you to enter the name of the certificate authority file which is used to validate the server certificate. This field is optional. If a server certificate is used, it should first be downloaded into the panel and the *Certificate Authority* field should then be set to the name of that certificate file. No file path should be used for this setting as all certificates are stored in a specific directory that the user cannot control or change. • Use the on-screen keyboard's **Clear** button to completely erase any previously stored network path information.
Inner Authentication Type:	When pressed, this field cycles through the choices of available Inner Authentication mechanism supported by the Devicescape Secure Wireless Client: • MSCHAPv2 (*default because its the most common*) • MSCHAP • PAP • CHAP • EAP-MSCHAPv2 • EAP-GTC • EAP-OTP • EAP-MD5-Challenge
Save/Cancel:	• **Save** - store the new security information, apply changes, and return to the previous page. • **Cancel** - discard changes and return to the previous page.

- Refer to the *EAP Authentication* section on page 166 for further details on these security options.
- Refer to the *Using the Site Survey tool* section on page 18 for more information on using this feature.

EAP-TLS Settings

TLS (Transport Layer Security) was the original standard wireless LAN EAP authentication protocol. TLS requires additional work during the deployment phase but provides additional security since even a compromised password is not enough to break into an EAP-TLS protected wireless network environment.

EAP-TLS security is designed for wireless environments where it is necessary to securely transmit data over a wireless network by adding an additional level of security protocol via the use of a private key.

EAP-TLS Settings	
SSID (Service Set Identifier):	Opens an on-screen keyboard to enter the SSID name used on the target WAP. The SSID is a unique name used by the WAP, and is assigned to all panels on that network. An SSID is required by the WAP before the panel is permitted to join the network. • The SSID is case sensitive and must not exceed 32 characters. • Make sure this setting is the same for all points in your wireless network. • NXA-WAP200Gs use **AMX** as their default SSID. • With EAP security, the SSID of the WAP *must* be entered. If it is left blank, the panel will try to connect to the first access point detected that supports EAP. However, a successful connection is not guaranteed because the detected WAP may be connected to a RADIUS server, which may not support this EAP type and/or have the proper user identities configured.
Identity:	Opens an on-screen keyboard. Enter an EAP Identity string (used by the panel to identify itself to an Authentication (RADIUS) Server). ***Note**: This information is similar to a username used to login to a secured server or workstation. This works in tandem with the Password string which is similar to the password entered to gain access to a secured workstation. Typically, this is in the form of a username such as: jdoe@amx.com.*
Certificate Authority:	When pressed, the panel displays an on-screen Certificate Authority (CA) File Location keyboard which allows you to enter the name of the certificate authority file which is used to validate the server certificate. This field is optional. If a server certificate is used, it should first be downloaded into the panel and the *Certificate Authority* field should then be set to the name of that certificate file. No file path should be used for this setting as all certificates are stored in a specific directory that the user cannot control or change. • Use the on-screen keyboard's **Clear** button to completely erase any previously stored network path information.
Client Certificate:	Opens an on-screen keyboard. Enter the name of the file containing the client (panel) certificate for use in certifying the identity of the client (panel). • Refer to the *Client certificate configuration* section for information regarding Client Certificates and their parameters.
Private Key:	When pressed, the panel displays an on-screen Client Private Key File Location keyboard which allows you to enter the name of the file containing the private key. • Use the on-screen keyboard's **Clear** button to completely erase any previously stored network path information.
Private Key password:	This field should only be used if the Private Key is protected with a password. If there is no password protection associated with the Private Key, then this field should be left ***blank***. • When pressed, the panel displays an on-screen Private Key Password keyboard which allows you to enter an alpha-numeric password string. • Use the on-screen keyboard's **Clear** button to completely erase any previously stored network path information.
Save/Cancel:	• **Save** - store the new security information, apply changes, and return to the previous page. • **Cancel** - discard changes and return to the previous page.

- Refer to the *EAP Authentication* section on page 166 for further details on these security options.
- Refer to the *Using the Site Survey tool* section on page 18 for more information on using this feature.

Client certificate configuration

There are several ways in which a client certificate can be configured by an IT department. The client certificate and private key can both be incorporated into one file or split into two separate files. In addition, the file format used by these files could be PEM, DER, or PKCS12. These formats are described later in this section. The following table describes how to fill in the fields for each possible case.

Client Certificate Configuration

Certificate Configuration	Client Certificate Field	Private Key Field
Single file contains both the client certificate and the private key. *Format is:* ***PEM*** *or* ***DER****.*	Enter the file name	Enter the same file name
First file contains the client certificate, second file contains the private key. *Format is:* ***PEM*** *or* ***DER****.*	Enter the first file name	Enter the second file name
Single file contains both the client certificate and the private key. *Format is:* ***PKCS12***	Leave this field blank	Enter the file name
First file contains the client certificate, second file contains the private key. *Format is:* ***PKCS12***	not supported	not supported

AMX supports the following security certificates

- PEM (Privacy Enhanced Mail)
- DER (Distinguished Encoding Rules)
- PKCS12 (Public Key Cryptography Standard #12)

NOTE

PKCS12 files are frequently generated by Microsoft certificate applications. Otherwise, PEM is more common.

Certificate files frequently use 5 file extensions. It can be confusing because there is not a one to one correspondence. The following table shows the possible file extension used for each certificate type:

Certificates and their Extensions

Certificate Type	Possible File Extensions
PEM	.cer .pem .pvk
DER	.cer .der
PKCS12	.pfx

It is important to note which certificate types are supported by the different certificate fields used on the configuration screens (PEAP, TTLS, and TLS). The following table outlines the firmware fields and their supported certificate types.

Certificate Types Supported by the Modero Firmware

Configuration Field Name	Certificate File Type Supported
Certificate Authority field	PEM and DER
Client Certificate field	PEM and DER
Private Key field	.PEM, DER, and PKCS12

Calibrate Page

This page (FIG. 57) allows you to calibrate the touch panel for accurate button selection.

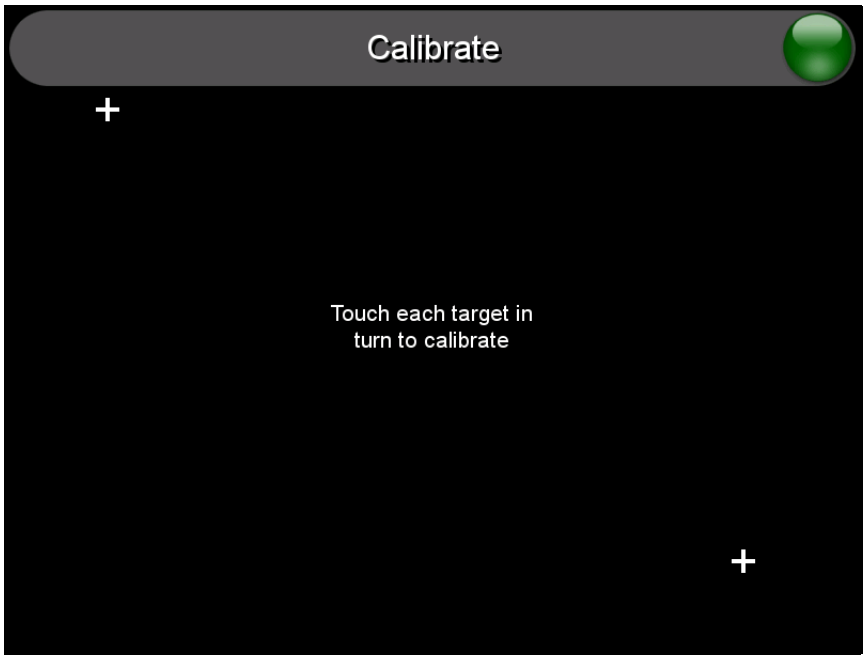


FIG. 57 Calibration page

- Press and hold the two lower button on both sides of the display for 6 seconds to access the Calibration page (see FIG. 8 on page 11).
- Press the crosshairs to calibrate the panel and return to the previous page.

Always calibrate the panel before its initial use, and after downloading new firmware.

NOTE

In cases where the touch panel calibration is off to a degree that makes it difficult or impossible to navigate to this page, you can access it via G4 WebControl, so you can re-calibrate the panel.

G4 Web Control Settings Page

An on-board VNC (Virtual Network Computing) server allows the panel to connect to any remote PC running a VNC client. Once connected, the client can view and control the panel remotely. The options on this page allow you to enable/disable G4 Web Control functionality(FIG. 58).

FIG. 58 G4 Web Control page

Features on this page include:

G4 Web Control Page	
Back:	Saves all changes and returns to the previous page.
WiFi/Wired icon:	The icon to the left of the Connection Status Icon displays whether the current connection to the Master is *Wireless* (image of a radio antenna) or *Wired* (image of three networked computers).
Connection Status icon:	The icon in the upper-right corner of each Setup page shows online/offline state of the panel to the master. • Bright red - disconnected • Bright green - connected. Blinks when a blink message is received to dark green every 5 seconds for half a second then go back to bright green. • Bright yellow - panel missed a blink message from the master. It will remain yellow for 3 missed blink messages and then turn red. It will return to green when a blink message is received. ***Note**: a Lock appears on the icon if the panel is connected to a secured NetLinx Master.*
G4 Web Control Settings:	Sets the IP communication values for the touch panel:
Enable/Enabled	The Enable/Enabled button allows you to toggle between the two G4 activation settings: • **Enable** - deactivates G4 Web Control on the panel. • **Enabled** - activates G4 Web Control on the panel.
Network Interface Select	Displays **"Wireless"** when the panel is communicating via a Wireless Access Point (WAP).
Web Control Name	Use this field to enter a unique alpha-numeric string to be used as the panel's display name within the *Manage WebControl Connections* window of the NetLinx Security browser window.
Web Control Password	Use this field to enter the G4 Authentication session password required for VNC access to the panel.
Web Control Port	Enter the number of the port used by the VNC Web Server. Default = 5900.

G4 Web Control Page (Cont.)	
Maximum Number of Connections	Displays the maximum number of users that can be simultaneously connected to this panel via VNC. Default = 1.
Current Connection Count	Displays the number of users currently connected to this panel via VNC.
G4 Web Control Timeout:	Sets the length of time (in minutes) that the panel can remain idle (no cursor movements) before the G4 Web Control session is terminated. • Minimum value = 0 minutes (panel never times out) • Maximum value = 240 minutes (panel times out after 240 minutes)

NOTE

Refer to the Using G4 Web Control to Interact with a G4 Panel section on page 29 *for instructions on using the G4 Web Control page with the web-based NetLinx Security application.*

Other Settings

The Other Settings button provides a menu to select the *Image Caching* page, *Password Setup* page, or *SIP Settings* page. Select any option to access its page.

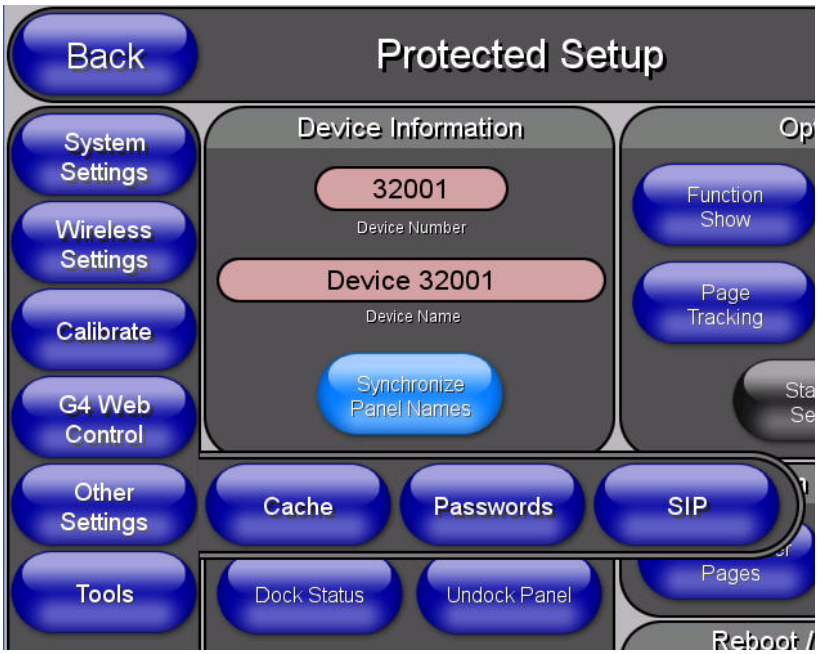


FIG. 59 Other Settings menu

Cache Settings Page

The Cache Settings page (FIG. 60) configures the allocation of memory for image caching. The G4 graphics engine caches images to decrease load time of previously viewed images. RAM caching is always enabled, and images (static, dynamic. and DynaMo™) are stored in the RAM cache as they are viewed. The size of RAM cache is automatically configured to take into account available memory versus memory that may be needed by the panel later. As the RAM cache approaches its maximum size, the oldest items in the cache may be discarded to make room for newer items. If Flash caching is enabled, dynamic images that would have been discarded will be moved to Flash, since it is typically faster to retrieve images on Flash than across a network (although it is slower than RAM cache). Note that since static images are already stored on Flash, they are never moved to the Flash cache, so Flash caching applies only to dynamic images. Images in Flash cache are moved back to RAM cache the next time they are viewed. As the Flash cache approaches its maximum size, the least recently used items may be discarded to make room for new items.

Flash memory can be allocated for image caching, but RAM cache is always enabled. Flash memory is a secondary cache and is much slower than RAM cache, as it uses Compact Flash to store images. Flash memory should not be used frequently, but it may be appropriate to use Flash memory in some environments that are dynamic image intensive, at

times when RAM cache is easily exhausted and the time taken to access Flash memory would be faster than network latency. For example, when large dynamic images are being used over slow wireless links, putting the images into Flash memory can help the situation, as the panel could spend more resources processing information rather than continuously waiting on images to arrive from a slow network.

NOTE

DynaMo is an extension of the Dynamic images feature of AMX G4 devices that provides playback of M-JPEG images. DynaMo Images are Motion-JPEG (or "M-JPEG") images that exist on an HTTP server, external to the panel. The hardware-decoded images update at the rate of the Dynamic Image server/camera they are viewing. The update rate can be up 30 fps on NTSC and 25 fps on PAL. The update rate is directly dependent on the quality of the network connection. For example, DynaMo images can include streaming webcam images, which can be displayed on a page, pop-up, or button. Like Dynamic Images, this feature requires you to specify a URL or IP Address in place of image file. For more information on setting up DynaMo images, consult the TPDesign4 (v2.11 or higher) Operation/Reference Guide.

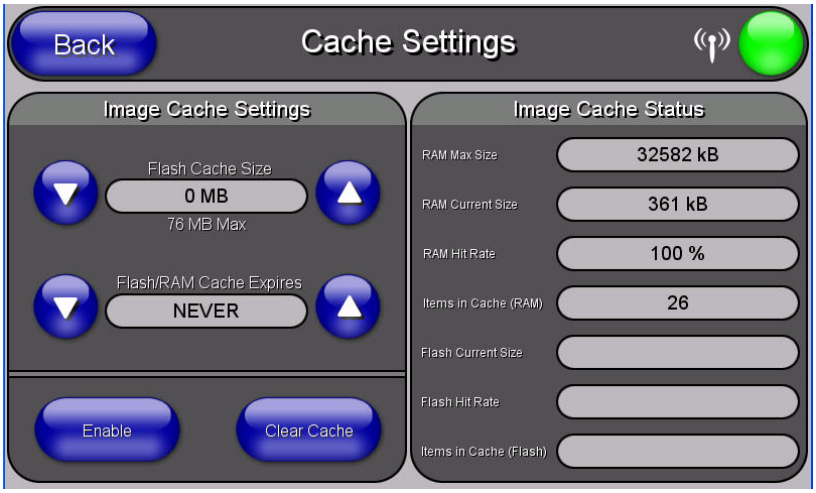


FIG. 60 Cache Settings Page

The elements of this page include:

Cache Settings Page Elements	
Back:	Saves all changes and returns to the previous page.
WiFi/Wired icon:	The icon to the left of the Connection Status Icon displays whether the current connection to the Master is *Wireless* (image of a radio antenna) or *Wired* (image of three networked computers).
Connection Status icon:	The icon in the upper-right corner of each Setup page shows online/offline state of the panel to the master. • Bright red - disconnected • Bright green - connected. Blinks when a blink message is received to dark green every 5 seconds for half a second then go back to bright green. • Bright yellow - panel missed a blink message from the master. It will remain yellow for 3 missed blink messages and then turn red. It will return to green when a blink message is received. ***Note**: a Lock appears on the icon if the panel is connected to a secured NetLinx Master.*
Image Cache Settings:	Allocates Flash memory for image caching.
Flash Cache Size	Press the Up and Down arrows to add and remove memory. Flash memory allocation cannot exceed the amount of Flash memory on the panel.

Cache Settings Page Elements (Cont.)	
Flash/RAM Cache Expires	Press the Up and Down arrows to change the amount of time the images stay in cache memory. The options are: • Never • 2 Hours • 8 Hours • 1 Day • 2 Days • 5 Days
Enable:	Press this button to toggle the image Flash cache option On and Off.
Clear Cache:	Press this button to clear both the Flash and RAM cache of all stored images.
Image Cache Status:	The status of the memory available versus in use.
RAM Max Size	The maximum amount of memory available for all image caching.
RAM Current Size	The memory that is currently in use for caching static and dynamic images.
RAM Hit Rate	The percentage of image requests (static and dynamic) satisfied by accessing the cache. 100 * (# of cache hits) / (# of cache hits + # of cache misses) # of cache hits - the number of times an image was requested that the image was found in the cache. If your hit rate is low, you may want to consider enabling Flash cache. # of cache misses - the number of times an image was requested that the image could not be found in the cache, and the image had to either be loaded from flash or obtained via the network (for dynamic images). It is considered a RAM Cache Miss even if the image is subsequently found in flash cache.
Items in Cache (RAM)	The number of images that are currently stored in the RAM cache.
Flash Current Size	The maximum flash space allocated for image caching. Flash space is used for caching only when there is not enough available memory in the RAM cache for a newly requested image (it is used only for dynamic images).
Flash Hit Rate	The percentage of image requests (dynamic only) that are satisfied by accessing the flash cache. 100 * (# of flash cache hits) / (# of flash cache hits + # of flash cache misses) # of flash cache hits - # of times a dynamic image could not be found in RAM cache but was found in flash cache # of flash cache misses - # of times a dynamic image could not be found in either RAM or flash cache. RAM cache hits are not relevant in this calculation.
Items in Cache (Flash)	The number of images that are currently stored in the Flash cache.

Setting the image cache

In the *Protected Setup* page:

1. Press the **Cache** button in the *Protected Setup Navigation Buttons* section. This opens the *Cache Settings* page.
2. Set the cache expiration in the field *Flash/RAM Cache Expires*. The Up and Down arrows increment through the available time frames.
3. Press the **Enable** button to turn on image caching. The button appears illuminated when enabled.

Select the Up and Down arrows for the field *Flash Cache Size* to increase or reduce the amount of Flash memory used; the maximum amount of flash that can be allocated for caching is 75% of available flash.

Clearing the image cache

In the *Protected Setup* page:

1. Press the **Cache** button in the *Protected Setup Navigation Buttons* section. This opens the *Image Cache* page.
2. Press **Clear Cache**. This clears all image cache currently stored on the panel (both Flash and RAM).

Checking image cache status

In the *Protected Setup* page:

Press the **Cache** button in the *Protected Setup Navigation Buttons* section. This opens the *Image Cache* page. All status information is located in the *Image Cache Status* section of the page.

Password Settings Page

The options on the *Password Settings* page enable you to assign the passwords required for users to access the *Protected Setup* page, and to release the MVP from a MVP-TDS or MVP-WDS docking station (FIG. 61).

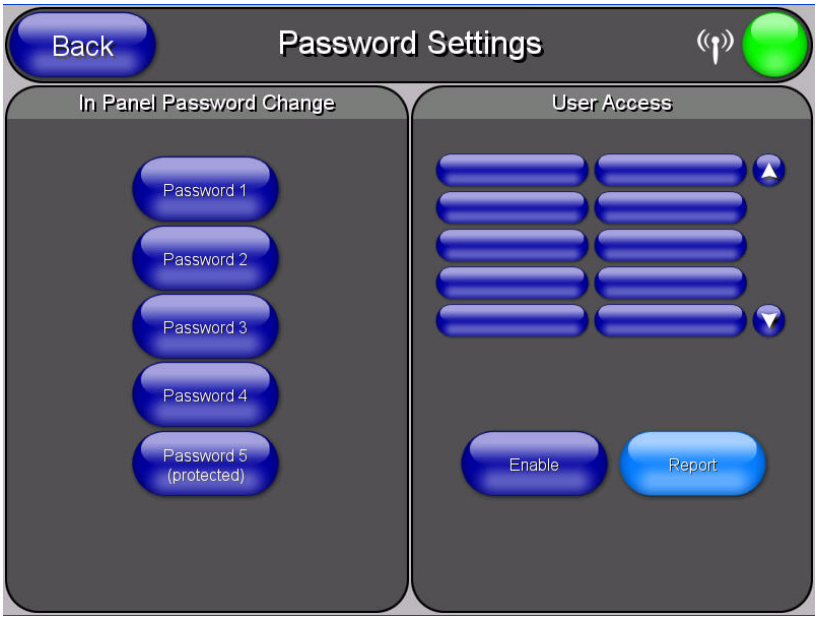


FIG. 61 Password Setup page

Features on this page include:

Password Settings Page	
Back:	Saves all changes and returns to the previous page.
WiFi/Wired icon:	The icon to the left of the Connection Status Icon displays whether the current connection to the Master is *Wireless* (image of a radio antenna) or *Wired* (image of three networked computers).
Connection Status icon:	The icon in the upper-right corner of each Setup page shows online/offline state of the panel to the master. • Bright red - disconnected • Bright green - connected. Blinks when a blink message is received to dark green every 5 seconds for half a second then go back to bright green. • Bright yellow - panel missed a blink message from the master. It will remain yellow for 3 missed blink messages and then turn red. It will return to green when a blink message is received. ***Note**: a Lock appears on the icon if the panel is connected to a secured NetLinx Master.*
In Panel Password Change:	Accesses the alphanumeric values associated to particular password sets. • The PASSWORD 1, 2, 3, 4, and 5 (protected) buttons open a keyboard to enter alphanumeric values associated to the selected password group. ***Note**: Clearing Password #5 removes the need to enter a password before accessing the Protected Setup page.*

Password Settings Page (Cont.)	
User Access:	Use these buttons to access and modify the user name/password combinations required for removing the panel from a docking station. The number of user access passwords on the panel is limited only by the amount of storage memory available. Use the **UP/DN** buttons to scroll through the list of saved User Access user names and passwords. The Enable/Enabled button allows you to toggle between activating or deactivating the MVP panel requirement of a user to enter a pre-defined password before removing the panel from a connected docking station: • **Enable** - does not prompt the user for a password, the docking station just releases the panel when the security release pushbutton is pressed. • **Enabled** - requires that a valid password from the User Access list be entered before removing a panel from a docking station. • The **Report** button enables/disables reporting the panel's docking status to the Master.

SIP Settings Page

The options on the SIP Settings page (FIG.) enable you to establish network settings for using your touch panel as an IP phone. With a CSG SIP Communications Gateway (**FG2182-01, -02, -03**), you can use your touch panel to make and receive local, long distance, and international phone calls, and have access to phone features like call waiting, caller ID, call forwarding, call queuing, and voice mail. Setting up your touch panel as a telephone requires that you set it up as one in the CSG SIP Communications Gateway. Refer to the *CSG SIP Communications Gateway Operation/Reference Guide* for information on setting up your touch panel to work as a telephone.

You may need to load a Duet module to enable the touch panel to receive SIP calls. The Duet module translates between the standard interface and the device protocol. It parses the buffer for responses from the device, sends strings to control the device, and receives commands from the UI module or telnet sessions. Refer to the documentation supplied with the Duet Module for more details.

NOTE

A sample UI module is provided in the module package. It is not intended to cover every possible application, but can be expanded as needed by a dealer to meet the requirements of a particular installation.

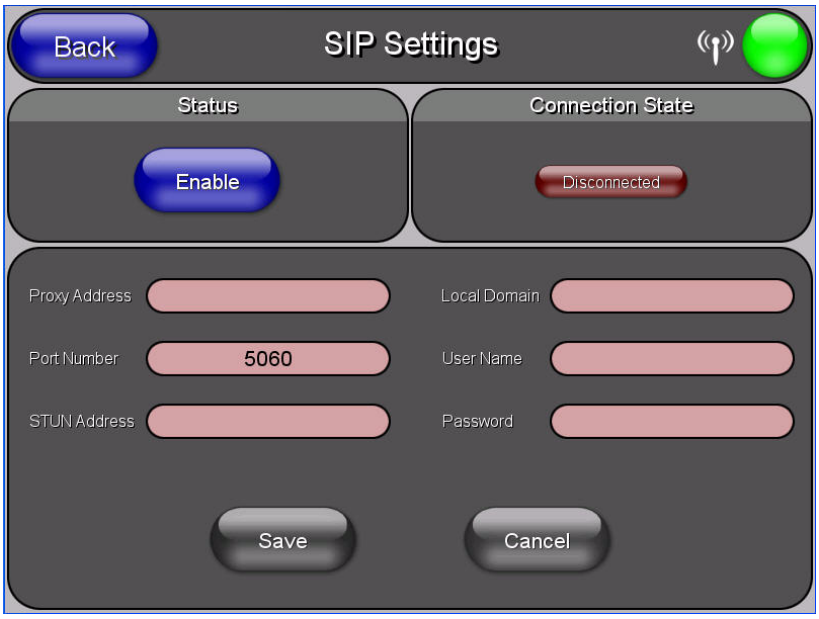


FIG. 62 SIP Settings Page

Features on this page include:

SIP Settings Page	
Back:	Saves all changes and returns to the previous page.
WiFi/Wired icon:	The icon to the left of the Connection Status Icon displays whether the current connection to the Master is *Wireless* (image of a radio antenna) or *Wired* (image of three networked computers).
Connection Status icon:	The icon in the upper-right corner of each Setup page shows online/offline state of the panel to the master. • Bright red - disconnected • Bright green - connected. Blinks when a blink message is received to dark green every 5 seconds for half a second then go back to bright green. • Bright yellow - panel missed a blink message from the master. It will remain yellow for 3 missed blink messages and then turn red. It will return to green when a blink message is received. ***Note**: a Lock appears on the icon if the panel is connected to a secured NetLinx Master.*
Status:	This option enables the SIP Stack on startup. If you disable this option, the panel will not attempt to read the rest of the configuration and will not register with a proxy server. However, point-to-point SIP will still be enabled allowing for existing intercom functionality.
Connection State:	This option displays whether you are connected to the proxy server.
Proxy Address:	This option enables you to enter the IP address or DNS name of the proxy server that you want to use to register.
Port Number:	The option displays the port you use to connect to the proxy server. The standard SIP port is 5060, but some providers use different ports.
STUN Address:	This option enables you to enter the IP address or DNS name of the Simple Traversal of UDP through NATs (STUN) server. This field is optional.
Local Domain:	This is the realm used for authentication. This field is optional.
User Name:	This option enables you to enter the user name used for authentication to the proxy server. The user name must match an extension defined in the SIP Gateway to "register" the panel so it can receive calls. Normally, the user name is the same as the phone number assigned to the extension you are using. This field is required.
Password:	This option enables you to enter the password for the user at the proxy server. This field is optional.

Tools

The Tools button provides a menu to select either the *Panel Connection Logs Page* section on page 80, the *Panel Statistics Page* section on page 82, or the *Connection Utility Page* section on page 83. Select any of the options to access that page.

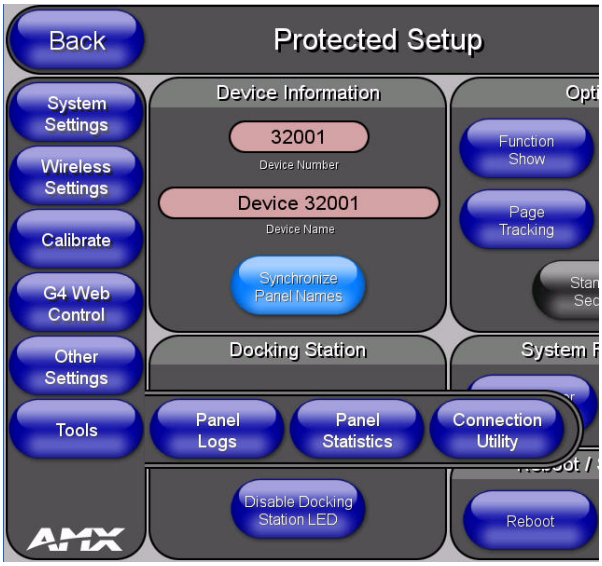


FIG. 63 Tools menu

Panel Connection Logs Page

The options on the Panel Connection Logs page allow you to view and track the connection history of the panel (FIG. 64).

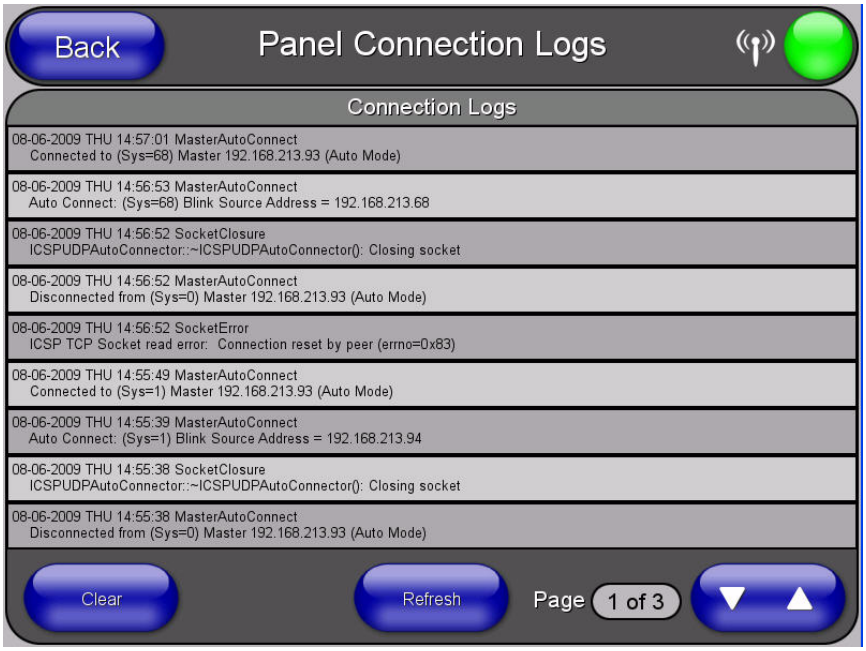

Back
Panel Connection Logs
Connection Logs
08-06-2009 THU 14:57:01 MasterAutoConnect
Connected to (Sys=68) Master 192.168.213.93 (Auto Mode)
08-06-2009 THU 14:56:53 MasterAutoConnect
Auto Connect: (Sys=68) Blink Source Address = 192.168.213.68
08-06-2009 THU 14:56:52 SocketClosure
ICSPUDPAutoConnector::~ICSPUDPAutoConnector(): Closing socket
08-06-2009 THU 14:56:52 MasterAutoConnect
Disconnected from (Sys=0) Master 192.168.213.93 (Auto Mode)
08-06-2009 THU 14:56:52 SocketError
ICSP TCP Socket read error: Connection reset by peer (errno=0x83)
08-06-2009 THU 14:55:49 MasterAutoConnect
Connected to (Sys=1) Master 192.168.213.93 (Auto Mode)
08-06-2009 THU 14:55:39 MasterAutoConnect
Auto Connect: (Sys=1) Blink Source Address = 192.168.213.94
08-06-2009 THU 14:55:38 SocketClosure
ICSPUDPAutoConnector::~ICSPUDPAutoConnector(): Closing socket
08-06-2009 THU 14:55:38 MasterAutoConnect
Disconnected from (Sys=0) Master 192.168.213.93 (Auto Mode)
Clear
Refresh
Page 1 of 3

FIG. 64 Panel Connection Logs page

Features on this page include:

Panel Connection Logs Page	
Back:	Saves all changes and returns to the previous page.
WiFi/Wired icon:	The icon to the left of the Connection Status Icon displays whether the current connection to the Master is *Wireless* (image of a radio antenna) or *Wired* (image of three networked computers).
Connection Status icon:	The icon in the upper-right corner of each Setup page shows online/offline state of the panel to the master. • Bright red - disconnected • Bright green - connected. Blinks when a blink message is received to dark green every 5 seconds for half a second then go back to bright green. • Bright yellow - panel missed a blink message from the master. It will remain yellow for 3 missed blink messages and then turn red. It will return to green when a blink message is received. ***Note**: a Lock appears on the icon if the panel is connected to a secured NetLinx Master.*
Connection Logs	A history of all connections, attempts, and failures for the panel.
Clear	Clears the Connection Logs history.
Refresh	Refreshes the Connection Logs history.
Page	Indicates the current page of the Connection Logs. Use the Up and Down arrows to move from one page to the next.

Checking the Panel Connection Logs

1. Press the **Tools** button in the *Protected Setup Navigation Buttons* section. This opens the *Tools* menu.
2. Within the *Tools* menu, press the **Panel Logs** button. All connection data is contained in the section *Connection Logs*.

Refreshing the Panel Connections Log

1. Press the **Tools** button in the *Protected Setup Navigation Buttons* section. This opens the *Tools* menu.
2. Within the *Tools* menu, press the **Panel Logs** button.
3. Push the **Refresh** button.

Clearing the Panel Connections Log

1. Press the **Tools** button in the *Protected Setup Navigation Buttons* section. This opens the *Tools* menu.
2. Within the *Tools* menu, press the **Panel Logs** button.
3. Push the **Clear** button.
4. Confirm your selection.

Panel Statistics Page

The options on the Panel Statistics page allow you to track the connection status for the panel. The *Panel Statistics* page tracks ICSP messages, Blink messages, Ethernet connection statistics, and Wireless connection statistics (FIG. 61).

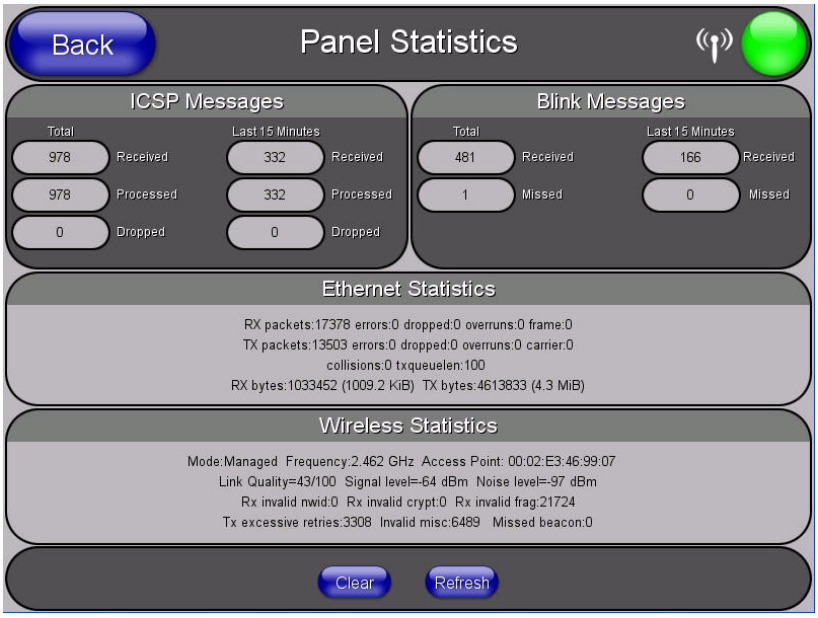


FIG. 65 Panel Statistics page

Features on this page include:

Panel Statistics Page	
Back:	Saves all changes and returns to the previous page.
WiFi/Wired icon:	The icon to the left of the Connection Status Icon displays whether the current connection to the Master is *Wireless* (image of a radio antenna) or *Wired* (image of three networked computers).
Connection Status icon:	The icon in the upper-right corner of each Setup page shows online/offline state of the panel to the master. • Bright red - disconnected • Bright green - connected. Blinks when a blink message is received to dark green every 5 seconds for half a second then go back to bright green. • Bright yellow - panel missed a blink message from the master. It will remain yellow for 3 missed blink messages and then turn red. It will return to green when a blink message is received. ***Note**: a Lock appears on the icon if the panel is connected to a secured NetLinx Master.*
ICSP Messages:	Messages sent between the master and the touch panel; it is the protocol they use to communicate to each other.
Total	• Received - The total ICSP messages received by the panel. • Processed - The total ICSP messages processed by the panel. • Dropped - The total ICSP messages dropped by the panel.
Last 15 Minutes	• Received - The total ICSP messages received by the panel in the last 15 minutes. • Processed - The total ICSP messages processed by the panel in the last 15 minutes. • Dropped - The total ICSP messages dropped by the panel in the last 15 minutes.
Blink Messages:	The master sends this message once every 5 seconds to all connected devices.

Panel Statistics Page (Cont.)	
Total	• Received - The total Blink messages received by the panel. • Missed - The total Blink messages missed by the panel.
Last 15 Minutes	• Received - The total Blink messages received by the panel in the last 15 minutes. • Missed - The total Blink messages missed by the panel in the last 15 minutes.
Ethernet Statistics	The Ethernet connection statistics for the panel.
Wireless Statistics	The Wireless connection statistics for the panel.
Clear	Clears all panel connection statistics.
Refresh	Refreshes all panel connection statistics.

Checking the Panel Statistics

1. Press the **Tools** button in the *Protected Setup Navigation Buttons* section. This opens the *Tools* menu.
2. Within the *Tools* menu, press the **Panel Statistics** button. All connection statistics are contained on this page, e.g., *Received, Processed, and Dropped ICSP Messages*.

Refreshing the Panel Statistics

1. Press the **Tools** button in the *Protected Setup Navigation Buttons* section. This opens the *Tools* menu.
2. Within the *Tools* menu, press the **Panel Statistics** button.
3. Push the **Refresh** button.

Clearing the Panel Statistics

1. Press the **Tools** button in the *Protected Setup Navigation Buttons* section. This opens the *Tools* menu.
2. Within the *Tools* menu, press the **Panel Statistics** button.
3. Push the **Clear** button.
4. Confirm your selection.

Connection Utility Page

The options on the *Connection Utility* page allow you to utilize your panel as a site survey tool. While in this page, move around your wireless network coverage area and see if there are any weak points within the spaces between your WAPs (FIG. 61).

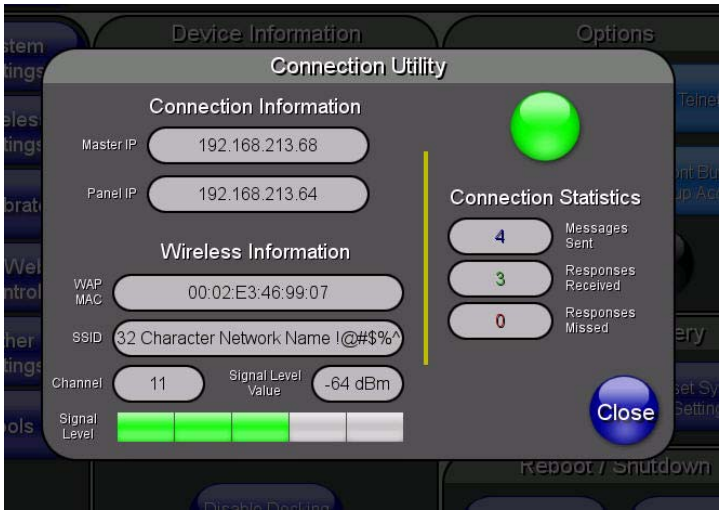


FIG. 66 Connection Utility page

Features on this page include:

Connection Utility Page	
Connection Status icon:	The icon in the upper-right corner of the utility provides a constant visual indication of current connection status. A message is sent to the master once per second and expects a response. • If it is received the button stays green. • If it is missed the button goes yellow. • After three misses (3 seconds) it will go red until a response from the master is received, and then it will be green again. Once per second, a user can know whether they are standing in a good wireless area (all green), an area of limited coverage (lots of yellow, some green, some red), or an area with no coverage (all red).
Connection Information:	
Master IP	The IP Address for the connected master.
Panel IP	The IP Address for the panel.
Wireless Information:	
WAP MAC	The MAC Address for the WAP currently in use. If the MAC Address changes, it means the panel has switched/roamed to a different access point. This can be used to determine coverage for each access point and help isolate "brown" areas where coverage is minimal or non-existent, and thus require another access installed.
SSID	Displays the currently used SSID of the target WAP.
Channel	The RF channel being used for connection to the WAP (*read -only*).
Signal Level Value	The data rate (in Mbps) at which the panel is currently communicating with the target WAP. ***Note**: Data rates for 802.11b communication are: 1, 2, 5.5, and 11 Mbps.*
Signal Level	Displays the quality of the link from the wireless NIC to the Wireless Access Point (direct sequence spread spectrum) in real time, in a bar graph. • Even when link quality is at its lowest you still have a connection, and the ability to transmit and receive data, even if at lower speeds. **Note:** “Signal Level Value” and “Signal Level” are applicable to RF connections only. It is possible to have an RF signal to a WAP, but be unable to communicate with it because of either incorrect IP or encryption settings.
Connection Statistics:	
Query Messages Sent	The number of messages sent from the panel to the master.
Responses Received	The number of responses the panel has received from the master.
Responses Missed	The number of expected responses from the master to the panel missed.
Close:	Closes the *Connection Utility* popup.

Using the Connection Utility

1. Press the **Tools** button in the *Protected Setup Navigation Buttons* section. This opens the *Tools* menu.
2. Within the *Tools* menu, press the **Connection Utility** button. This launches the *Connection Utility* popup.
3. Move the panel throughout your wireless network, and changes within the utility. The *Connection Information* notes the IP of the connected master and the IP of your panel. The *Wireless Information* indicates the current wireless connection method for the panel, e.g., the MAC Address for the WAP currently in use. The *Connection Statistics* show the current quality of the panel connection.
4. Push **Close** when you are done using the Site Survey tool.

EAP Security & Server Certificates

Overview

The following EAP types all support a server certificate:

- EAP-PEAP
- EAP-TTLS
- EAP-TLS

All three of these certificate-using security methods are documented in the following sections. EAP Authentication goes a step beyond just encrypting data transfers, but also requires that a set of credentials be validated before the client (panel) is allowed to connect to the rest of the network (FIG. 67). Below is a description of this process. It is important to note that there is no user intervention necessary during this process. It proceeds automatically based on the configuration parameters entered into the panel.

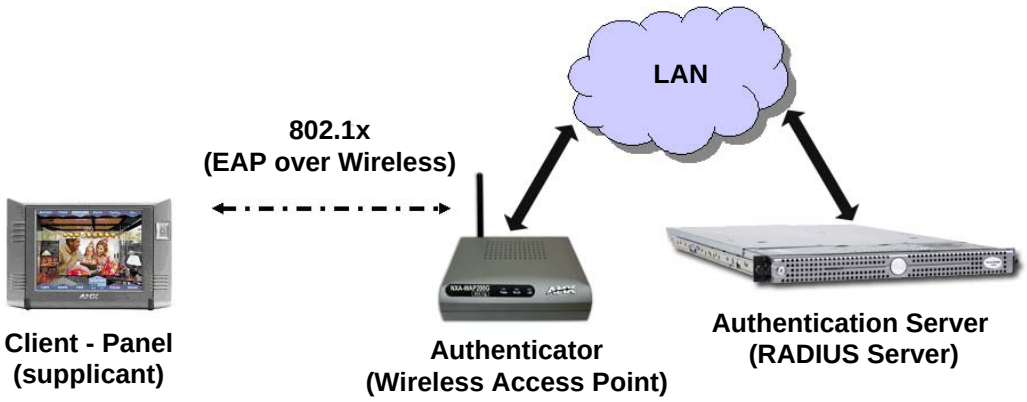


FIG. 67 EAP security method in process

A server certificate file uses a certificate that is installed in a panel so that the RADIUS server can be validated before the panel tries to connect to it. The field name associated with this file is *Certificate Authority.*

If a server certificate is used, it should first be downloaded into the panel and the *Certificate Authority* field should then be set to the name of that certificate file. No file path should be used for this setting as all certificates are stored in a specific directory that the user cannot control or change. The most secure connection method uses a server certificate.

If no server certificate will be used then, this field should be left blank. If the field contains a file name, then a valid certificate file with the same file name must be previously installed on the panel. Otherwise the authentication process will fail.

Full Duplex Intercom

Overview

VoIP technology gives users the ability to instantly create a high-quality, digital home/office intercom network with no additional equipment required. By utilizing VoIP intercom, system integration is simple and calls sound incredibly clear.

Incorporating an intercom capable panel into your NetLinx system

Download the module for the intercom panel from **www.amx.com**, and include it in your NetLinx project file. For searching purposes, the module *manufacturer* is **AMX** and the *model* is **Intercom**.

NOTE

The intercom module will only work with AMX intercom capable panels.

Panel Intercom Configuration

Setup

The setup page allows you to set the session timeout for intercom calls, toggle intercom auto-answer on and off, and provides access to the *Advanced Setup* page.

FIG. 68 Intercom Setup Page

Setting the Intercom Session Timeout

1. Select the **Setup** button on your intercom page.
2. Press the up or down arrows to increment the timeout up by 1 second in each direction. If your call exceeds your session timeout the panel provides you with a popup (FIG. 69) to extend the session.

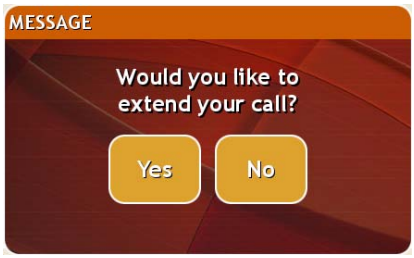


FIG. 69 Extend Call Popup

3. Press **Exit** when you are finished.

Setting Intercom Auto Answer

1. Select the **Setup** button on your intercom page.
2. Press the button beneath *Auto-Answer* to toggle the option. The button indicates its current state.
3. Press **Exit** when you are finished.

Advanced Setup

The intercom's advanced setup pages are accessed through the intercom setup pages. The advanced pages allow you to set the panel intercom to be monitored, to monitor other intercom panels, and to name the panel. It is important to name the intercom panel; the name is displayed in other panels' intercom call directory pages.

FIG. 70 Intercom Advanced Setup Page

Allowing a panel to be monitored

1. Select the **Setup** button on your intercom page.
2. On the intercom setup page, press **Advanced Setup**. This launches the password numeric keypad.
3. Enter the password and press **Done**. The default password is *Password 4* of the panel's firmware *Password Setup*.

4. Press the button beneath *Allow This Panel to be Monitored* to toggle the option. The button indicates its current state. (FIG. 71)

FIG. 71 Room Monitored

5. Press **Back** to return to the intercom setup pages.
6. Press **Exit** when you are finished.

Allowing a panel to monitor

1. Select the **Setup** button on your intercom page.
2. On the intercom setup page, press **Advanced Setup**. This launches the password numeric keypad.
3. Enter the password and press **Done**. The default password is *Password 4* of the panel's firmware *Password Setup*.
4. Press the button beneath *Allow This Panel to Monitor* to toggle the option. The button indicates its current state. If you attempt to monitor a panel that has not given permission to be monitored, your panel provides the popup in FIG. 72.

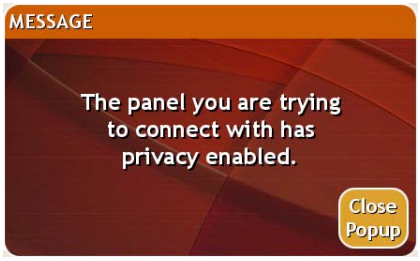


FIG. 72 Privacy Enabled

5. Press **Back** to return to the intercom setup pages.
6. Press **Exit** when you are finished.

Naming a panel

1. Select the **Setup** button on your intercom page.
2. On the intercom setup page, press **Advanced Setup**. This launches the password numeric keypad.
3. Enter the password and press **Done**. The default password is *Password 4* of the panel's firmware *Password Setup*.
4. Press in the area under *Panel Name*. This launches a on screen keyboard.
5. Type the name of the panel and press **Done**. This is the name that is displayed in other panels' intercom call directory pages.
6. Press **Back** to return to the intercom setup pages.
7. Press **Exit** when you are finished.

Sample Intercom Page

The module for duplex intercom capable panels includes user pages. While you can create your own intercom directory page (see *Creating Intercom Pages* section on page 93), it is possible to use the panel with the page below.

FIG. 73 Sample Intercom Page

Sample Intercom Page					
No.	Name	Description	Channel Port:Code	Address Port:Code	Level Port:Code
1	Room Name	The name of the panel as it appears in other intercom directories. See *Naming a panel* section on page 89.		0:265	
2	Page All	Pages all connected intercom panels.	1:6		
3	Place Call	Initiates an intercom call to a panel.	1:7		
4	End Call	Ends an intercom call to a panel.	1:8		
5	Privacy Off	Toggles the privacy option of the intercom. When enabled, other panels cannot contact the panel.	1:9		
6	Monitor Room	Enables the panel to monitor another room's intercom panel.	1:19		
7	Panel Directory Room Name	The name of a panel in the intercom directory. You can call the panel, enact privacy against the panel and monitor the panel.	1:1	1:1	

Sample Intercom Page (Cont.)					
No.	Name	Description	Channel Port:Code	Address Port:Code	Level Port:Code
8	Panel Directory Room Name	The name of a panel in the intercom directory. You can call the panel, enact privacy against the panel and monitor the panel.	1:2	1:2	
9	Panel Directory Room Name	The name of a panel in the intercom directory. You can call the panel, enact privacy against the panel and monitor the panel.	1:3	1:3	
10	Panel Directory Room Name	The name of a panel in the intercom directory. You can call the panel, enact privacy against the panel and monitor the panel.	1:4	1:4	
11	Panel Directory Room Name	The name of a panel in the intercom directory. You can call the panel, enact privacy against the panel and monitor the panel.	1:5	1:5	
12	Call Panel	Display only; indicates the panel is currently in a call.	1:21		
13	Call Panel	Display only; indicates the panel is currently in a call.	1:24		
14	Call Panel	Display only; indicates the panel is currently in a call.	1:27		
15	Call Panel	Display only; indicates the panel is currently in a call.	1:30		
16	Call Panel	Display only; indicates the panel is currently in a call.	1:33		
17	Panel Privacy	Display only; indicates the panel has privacy enabled.	1:22		
18	Panel Privacy	Display only; indicates the panel has privacy enabled.	1:25		
19	Panel Privacy	Display only; indicates the panel has privacy enabled.	1:28		
20	Panel Privacy	Display only; indicates the panel has privacy enabled.	1:31		
21	Panel Privacy	Display only; indicates the panel has privacy enabled.	1:34		
22	Monitor Panel	Display only; indicates the panel is being monitored by another panel.	1:23		
23	Monitor Panel	Display only; indicates the panel is being monitored by another panel.	1:26		
24	Monitor Panel	Display only; indicates the panel is being monitored by another panel.	1:29		
25	Monitor Panel	Display only; indicates the panel is being monitored by another panel.	1:32		

Sample Intercom Page (Cont.)					
No.	Name	Description	Channel Port:Code	Address Port:Code	Level Port:Code
26	Monitor Panel	Display only; indicates the panel is being monitored by another panel.	1:35		
27	Intercom Microphone Level	A Bargraph in TPDesign4 that sets the volume of the intercom microphone.			0:10
28	Intercom Sound Level	A Bargraph in TPDesign4 that sets the volume of the intercom speaker.			0:9
29	Call Status Button	Displays status of calls, e.g., incoming caller id, connected, rejected.		1:10	
30	Navigate Up	Increments the intercom directory up.	1:13		
31	Navigate Down	Increments the intercom directory down.	1:14		
32	Intercom Setup Page	Navigates the intercom panel to the intercom *Setup page*. This requires a standard page flip to *Setup*.			

Answering an incoming call

The provided intercom pages include an answering popup window. The popup page indicates the name of the panel calling and two options:

- **Answer** - Pressing this button opens the intercom session with the other panel.
- **Ignore** - Pressing this button denies the intercom session with the other panel.

FIG. 74 Answer Call

To answer a call:

In the popup window, press the **Answer** button.

Creating Intercom Pages

The easiest method of creating your own intercom pages is to start with the pages provided by AMX in the module download .ZIP file. You can change the aesthetics of the pages as long as the channel, address, level and links remain untouched.

For the more ambitious panel designers, the necessary intercom directory buttons and their information are contained in the Sample Intercom Page table on page 90.

Additionally, the *Setup* page, *Advanced Setup* page, and the popups can be edited. See below:

Setup			
Name	Description	Channel Port:Code	Address Port:Code
Auto-Answer OFF	Toggle the panel's auto-answer feature off and on.	1:12	
Session Timeout	A display of the current session timeout.		1:9
Increment Up	Increments the intercom session time up.	1:15	
Increment Down	Increments the intercom session time down.	1:16	
Room Name	The name of the panel as it appears in other intercom directories. See *Naming a panel* section on page 89.		0:265
Advanced Setup	Navigates the intercom panel to the intercom *Advanced Setup* page. This requires a standard page flip to *Advanced Setup*.		
Exit Setup	Navigates the intercom panel to the intercom directory page. This requires a standard page flip to the intercom directory.		

Advanced Setup			
Name	Description	Channel Port:Code	Address Port:Code
Allow Panel to be Monitored	Toggle the panel's ability to be monitored off and on.	1:11	
Allow Panel to Monitor	Toggle the panel's ability to monitor off and on.	1:10	
Room Name	The name of the panel as it appears in other intercom directories. See *Naming a panel* section on page 89.		0:265
Name Panel	Set the name of the panel as it appears in other intercom directories. (G4 Web Control: Server Name)	0:334	0:265
Back	Navigates the intercom panel to the intercom *Setup page*. This requires a standard page flip to *Setup*.		

More Time Popup			
Name	Description	Channel Port:Code	Address Port:Code
Confirm More Time	Select to extend intercom session beyond timeout.	1:20	

Answer Intercom Call Popup			
Name	Description	Channel Port:Code	Address Port:Code
Answer	Opens the intercom session with the other panel.	1:17	
Ignore	Denies the intercom session with the other panel.	1:18	
Room Name	The name of the panel as it appears in other intercom directories. See *Naming a panel* section on page 89.		1:7

Programming

Overview

You can program the touch panel, using the commands in this section, to perform a wide variety of operations using Send_Commands and variable text commands.

A device must first be defined in the NetLinx programming language with values for the Device: Port: System (in all programming examples - ***Panel*** is used in place of these values and represents all Modero panels).

Verify you are using the latest NetLinx Master and Modero firmware.
Verify you are using the latest version of NetLinx Studio and TPD4.

Button Assignments

- Button Channel Range: 1 - 4000 Button push and Feedback (per address port)
- Button Variable Text range: 1 - 4000 (per address port)
- Button States Range: 1 - 256 (0 = All states, for General buttons 1 = Off state and 2 = On state).
- Level Range: 1 - 600 (Default level value 0 - 255, can be set up to 1 - 65535)
- Address port Range: 1 - 100

These button assignments can only be adjusted in TPD4 and not on the panels themselves.

Page Commands

These Page Commands are used in NetLinx Programming Language and are case insensitive.

Page Commands	

@APG
Add a specific popup page to a specified popup group.
	Add the popup page to a group if it does not already exist. If the new popup is added to a group which has a popup displayed on the current page along with the new pop-up, the displayed popup will be hidden and the new popup will be displayed.
	Syntax:
	`"'@APG-<popup page name>;<popup group name>'"`
	Variable:
	popup page name = 1 - 50 ASCII characters. Name of the popup page.
	popup group name = 1 - 50 ASCII characters. Name of the popup group.
	Example:
	`SEND_COMMAND Panel,"'@APG-Popup1;Group1'"`
	Adds the popup page 'Popup1' to the popup group 'Group1'.

@CPG
Clear all popup pages from specified popup group.
	Syntax:
	`"'@CPG-<popup group name>'"`
	Variable:
	popup group name = 1 - 50 ASCII characters. Name of the popup group.
	Example:
	`SEND_COMMAND Panel,"'@CPG-Group1'"`
	Clears all popup pages from the popup group 'Group1'.

Page Commands (Cont.)	

@DPG
Delete a specific popup page from specified popup group if it exists.
	Syntax:
	`"'@DPG-<popup page name>;<popup group name>'"`
	Variable:
	popup page name = 1 - 50 ASCII characters. Name of the popup page.
	popup group name = 1 - 50 ASCII characters. Name of the popup group.
	Example:
	`SEND_COMMAND Panel,"'@DPG-Popup1;Group1'"`
	Deletes the popup page 'Popup1' from the popup group 'Group1'.

@PDR
Set the popup location reset flag.
	If the flag is set, the popup will return to its default location on show instead of its last drag location.
	Syntax:
	`"'@PDR-<popup page name>;<reset flag>'"`
	Variable:
	popup page name = 1 - 50 ASCII characters. Name of the page the popup is displayed On.
	reset flag = 1 = Enable reset flag
	0 = Disable reset flag
	Example:
	`SEND_COMMAND Panel,"'@PDR-Popup1;1'"`
	Popup1 will return to its default location when turned On.

@PHE
Set the hide effect for the specified popup page to the named hide effect.
	Syntax:
	`"'@PHE-<popup page name>;<hide effect name>'"`
	Variable:
	popup page name = 1 - 50 ASCII characters. Name of the page the popup is displayed On.
	hide effect name = Refers to the popup effect names being used.
	Example:
	`SEND_COMMAND Panel,"'@PHE-Popup1;Slide to Left'"`
	Sets the Popup1 hide effect name to 'Slide to Left'.

@PHP
Set the hide effect position.
	Only 1 coordinate is ever needed for an effect; however, the command will specify both. This command sets the location at which the effect will end at.
	Syntax:
	`"'@PHP-<popup page name>;<x coordinate>,<y coordinate>'"`
	Variable:
	popup page name = 1 - 50 ASCII characters. Name of the page the popup is displayed On.
	Example:
	`SEND_COMMAND Panel,"'@PHP-Popup1;75,0'"`
	Sets the Popup1 hide effect x-coordinate value to 75 and the y-coordinate value to 0.

@PHT
Set the hide effect time for the specified popup page.
	Syntax:
	`"'@PHT-<popup page name>;<hide effect time>'"`
	Variable:
	popup page name = 1 - 50 ASCII characters. Name of the page the popup is displayed On.
	hide effect time = Given in 1/10ths of a second.
	Example:
	`SEND_COMMAND Panel,"'@PHT-Popup1;50'"`
	Sets the Popup1 hide effect time to 5 seconds.

Page Commands (Cont.)	

@PPA
Close all popups on a specified page.
	If the page name is empty, the current page is used. Same as the 'Clear Page' command in TPDesign4.
	Syntax:
	`"'@PPA-<page name>'"`
	Variable:
	page name = 1 - 50 ASCII characters. Name of the page the popup is displayed On.
	Example:
	`SEND_COMMAND Panel,"'@PPA-Page1'"`
	Close all popups on Page1.

@PPF
Deactivate a specific popup page on either a specified page or the current page.
	If the page name is empty, the current page is used (see example 2). If the popup page is part of a group, the whole group is deactivated. This command works in the same way as the 'Hide Popup' command in TPDesign4.
	Syntax:
	`"'@PPF-<popup page name>;<page name>'"`
	Variable:
	popup page name = 1 - 50 ASCII characters. Name of the popup page.
	page name = 1 - 50 ASCII characters. Name of the page the popup is displayed On.
	Example:
	`SEND_COMMAND Panel,"'@PPF-Popup1;Main'"`
	Example 2:
	`SEND_COMMAND Panel,"'@PPF-Popup1'"`
	Deactivates the popup page 'Popup1' on the current page.

@PPG
Toggle a specific popup page on either a specified page or the current page.
	If the page name is empty, the current page is used (see example 2). Toggling refers to the activating/deactivating (On/Off) of a popup page. This command works in the same way as the 'Toggle Popup' command in TPDesign4.
	Syntax:
	`"'@PPG-<popup page name>;<page name>'"`
	Variable:
	popup page name = 1 - 50 ASCII characters. Name of the popup page.
	page name = 1 - 50 ASCII characters. Name of the page the popup is displayed On.
	Example:
	`SEND_COMMAND Panel,"'@PPG-Popup1;Main'"`
	Toggles the popup page 'Popup1' on the 'Main' page from one state to another (On/Off).
	Example 2:
	`SEND_COMMAND Panel,"'@PPG-Popup1'"`
	Toggles the popup page 'Popup1' on the current page from one state to another (On/Off).

@PPK
Kill a specific popup page from all pages.
	Kill refers to the deactivating (Off) of a popup window from all pages. If the pop-up page is part of a group, the whole group is deactivated. This command works in the same way as the 'Clear Group' command in TPDesign 4.
	Syntax:
	`"'@PPK-<popup page name>'"`
	Variable:
	popup page name = 1 - 50 ASCII characters. Name of the popup page.
	Example:
	`SEND_COMMAND Panel,"'@PPK-Popup1'"`
	Kills the popup page 'Popup1' on all pages.

Page Commands (Cont.)	

@PPM
Set the modality of a specific popup page to Modal or NonModal.
	A Modal popup page, when active, only allows you to use the buttons and features on that popup page. All other buttons on the panel page are inactivated.
	Syntax:
	`"'@PPM-<popup page name>;<mode>'"`
	Variable:
	popup page name = 1 - 50 ASCII characters. Name of the popup page.
	mode = NONMODAL converts a previously Modal popup page to a NonModal.
	MODAL converts a previously NonModal popup page to Modal.
	modal = 1 and non-modal = 0
	Example:
	`SEND_COMMAND Panel,"'@PPM-Popup1;Modal'"`
	Sets the popup page 'Popup1' to Modal.
	`SEND_COMMAND Panel,"'@PPM-Popup1;1'"`
	Sets the popup page 'Popup1' to Modal.

@PPN
Activate a specific popup page to launch on either a specified page or the current page.
	If the page name is empty, the current page is used (see example 2). If the popup page is already on, do not re-draw it. This command works in the same way as the 'Show Popup' command in TPDesign4.
	Syntax:
	`"'@PPN-<popup page name>;<page name>'"`
	Variable:
	popup page name = 1 - 50 ASCII characters. Name of the popup page.
	page name = 1 - 50 ASCII characters. Name of the page the popup is displayed On.
	Example:
	`SEND_COMMAND Panel,"'@PPN-Popup1;Main'"`
	Activates 'Popup1' on the 'Main' page.
	Example 2:
	`SEND_COMMAND Panel,"'@PPN-Popup1'"`
	Activates the popup page 'Popup1' on the current page.

@PPT
Set a specific popup page to timeout within a specified time.
	If timeout is empty, popup page will clear the timeout.
	Syntax:
	`"'@PPT-<popup page name>;<timeout>'"`
	Variable:
	popup page name = 1 - 50 ASCII characters. Name of the popup page.
	timeout = Timeout duration in 1/10ths of a second.
	Example:
	`SEND_COMMAND Panel,"'@PPT-Popup1;30'"`
	Sets the popup page 'Popup1' to timeout within 3 seconds.

@PPX
Close all popups on all pages.
	This command works in the same way as the 'Clear All' command in TPDesign 4.
	Syntax:
	`"'@PPX'"`
	Example:
	`SEND_COMMAND Panel,"'@PPX'"`
	Close all popups on all pages.

@PSE
Set the show effect for the specified popup page to the named show effect.
	Syntax:
	`"'@PSE-<popup page name>;<show effect name>'"`
	Variable:
	popup page name = 1 - 50 ASCII characters. Name of the page the popup is displayed On.
	show effect name = Refers to the popup effect name being used.
	Example:
	`SEND_COMMAND Panel,"'@PSE-Popup1;Slide from Left'"`
	Sets the Popup1 show effect name to 'Slide from Left'.

Page Commands (Cont.)	

@PSP
Set the show effect position.
	Only 1 coordinate is ever needed for an effect; however, the command will specify both. This command sets the location at which the effect will begin at.
	Syntax:
	`"'@PSP-<popup page name>;<x coordinate>,<y coordinate>'"`
	Variable:
	popup page name = 1 - 50 ASCII characters. Name of the page the popup is displayed On.
	Example:
	`SEND_COMMAND Panel,"'@PSP-Popup1;100,0'"`
	Sets the Popup1 show effect x-coordinate value to 100 and the y-coordinate value to 0.

@PST
Set the show effect time for the specified popup page.
	Syntax:
	`"'@PST-<popup page name>;<show effect time>'"`
	Variable:
	popup page name = 1 - 50 ASCII characters. Name of the page the popup is displayed On.
	show effect time = Given in 1/10ths of a second.
	Example:
	`SEND_COMMAND Panel,"'@PST-Popup1;50'"`
	Sets the Popup1 show effect time to 5 seconds.

PAGE
Flip to a specified page.
	Flips to a page with a specified page name. If the page is currently active, it will not redraw the page.
	Syntax:
	`"'PAGE-<page name>'"`
	Variable:
	page name = 1 - 50 ASCII characters. Name of the page the popup is displayed On.
	Example:
	`SEND_COMMAND Panel,"'PAGE-Page1'"`
	Flips to page1.

PPOF
Deactivate a specific popup page on either a specified page or the current page.
	If the page name is empty, the current page is used (see example 2). If the popup page is part of a group, the whole group is deactivated. This command works in the same way as the 'Hide Popup' command in TPDesign4.
	Syntax:
	`"'PPOF-<popup page name>;<page name>'"`
	Variable:
	popup page name = 1 - 50 ASCII characters. Name of the popup page.
	page name = 1 - 50 ASCII characters. Name of the page the popup is displayed On.
	Example:
	`SEND_COMMAND Panel,"'PPOF-Popup1;Main'"`
	Deactivates the popup page 'Popup1' on the Main page.
	Example 2:
	`SEND_COMMAND Panel,"'PPOF-Popup1'"`
	Deactivates the popup page 'Popup1' on the current page.

Page Commands (Cont.)	

PPOG
Toggle a specific popup page on either a specified page or the current page.
	If the page name is empty, the current page is used (see example 2). Toggling refers to the activating/deactivating (On/Off) of a popup page. This command works in the same way as the 'Toggle Popup' command in TPDesign4.
	Syntax:
	`"'PPOG-<popup page name>;<page name>'"`
	Variable:
	popup page name = 1 - 50 ASCII characters. Name of the popup page.
	page name = 1 - 50 ASCII characters. Name of the page the popup is displayed On.
	Example:
	`SEND_COMMAND Panel,"'PPOG-Popup1;Main'"`
	Toggles the popup page 'Popup1' on the Main page from one state to another (On/Off).
	Example 2:
	`SEND_COMMAND Panel,"'PPOG-Popup1'"`
	Toggles the popup page 'Popup1' on the current page from one state to another (On/Off).

PPON
Activate a specific popup page to launch on either a specified page or the current page.
	If the page name is empty, the current page is used (see example 2). If the popup page is already On, do not re-draw it. This command works in the same way as the 'Show Popup' command in TPDesign4.
	Syntax:
	`"'PPON-<popup page name>;<page name>'"`
	Variable:
	popup page name = 1 - 50 ASCII characters. Name of the popup page.
	page name = 1 - 50 ASCII characters. Name of the page the popup is displayed On.
	Example:
	`SEND_COMMAND Panel,"'PPON-Popup1; Main'"`
	Activates the popup page 'Popup1' on the Main page.
	Example 2:
	`SEND_COMMAND Panel,"'PPON-Popup1'"`
	Activates the popup page 'Popup1' on the current page.

Programming Numbers

The following information provides the programming numbers for colors, fonts, and borders.

Colors can be used to set the colors on buttons, sliders, and pages. The lowest color number represents the lightest color-specific display; the highest number represents the darkest display. For example, 0 represents light red, and 5 is dark red.

RGB triplets and names for basic 88 colors

RGB Values for all 88 Basic Colors				
Index No.	Name	Red	Green	Blue
00	Very Light Red	255	0	0
01	Light Red	223	0	0
02	Red	191	0	0
03	Medium Red	159	0	0
04	Dark Red	127	0	0
05	Very Dark Red	95	0	0
06	Very Light Orange	255	128	0
07	Light Orange	223	112	0
08	Orange	191	96	0
09	Medium Orange	159	80	0
10	Dark Orange	127	64	0
11	Very Dark Orange	95	48	0
12	Very Light Yellow	255	255	0
13	Light Yellow	223	223	0
14	Yellow	191	191	0
15	Medium Yellow	159	159	0
16	Dark Yellow	127	127	0
17	Very Dark Yellow	95	95	0
18	Very Light Lime	128	255	0
19	Light Lime	112	223	0
20	Lime	96	191	0
21	Medium Lime	80	159	0
22	Dark Lime	64	127	0
23	Very Dark Lime	48	95	0
24	Very Light Green	0	255	0
25	Light Green	0	223	0
26	Green	0	191	0
27	Medium Green	0	159	0
28	Dark Green	0	127	0
29	Very Dark Green	0	95	0
30	Very Light Mint	0	255	128
31	Light Mint	0	223	112
32	Mint	0	191	96
33	Medium Mint	0	159	80
34	Dark Mint	0	127	64
35	Very Dark Mint	0	95	48
36	Very Light Cyan	0	255	255
37	Light Cyan	0	223	223

RGB Values for all 88 Basic Colors (Cont.)				
Index No.	Name	Red	Green	Blue
38	Cyan	0	191	191
39	Medium Cyan	0	159	159
40	Dark Cyan	0	127	127
41	Very Dark Cyan	0	95	95
42	Very Light Aqua	0	128	255
43	Light Aqua	0	112	223
44	Aqua	0	96	191
45	Medium Aqua	0	80	159
46	Dark Aqua	0	64	127
47	Very Dark Aqua	0	48	95
48	Very Light Blue	0	0	255
49	Light Blue	0	0	223
50	Blue	0	0	191
51	Medium Blue	0	0	159
52	Dark Blue	0	0	127
53	Very Dark Blue	0	0	95
54	Very Light Purple	128	0	255
55	Light Purple	112	0	223
56	Purple	96	0	191
57	Medium Purple	80	0	159
58	Dark Purple	64	0	127
59	Very Dark Purple	48	0	95
60	Very Light Magenta	255	0	255
61	Light Magenta	223	0	223
62	Magenta	191	0	191
63	Medium Magenta	159	0	159
64	Dark Magenta	127	0	127
65	Very Dark Magenta	95	0	95
66	Very Light Pink	255	0	128
67	Light Pink	223	0	112
68	Pink	191	0	96
69	Medium Pink	159	0	80
70	Dark Pink	127	0	64
71	Very Dark Pink	95	0	48
72	White	255	255	255
73	Grey1	238	238	238
74	Grey3	204	204	204
75	Grey5	170	170	170
76	Grey7	136	136	136
77	Grey9	102	102	102
78	Grey4	187	187	187
79	Grey6	153	153	153
80	Grey8	119	119	119
81	Grey10	85	85	85

RGB Values for all 88 Basic Colors (Cont.)				
Index No.	Name	Red	Green	Blue
82	Grey12	51	51	51
83	Grey13	34	34	34
84	Grey2	221	221	221
85	Grey11	68	68	68
86	Grey14	17	17	17
87	Black	0	0	0
255	TRANSPARENT	99	53	99

Font Styles and ID Numbers

Font styles can be used to program the text fonts on buttons, sliders, and pages. The following chart shows the default font type and their respective ID numbers generated by TPDesign4.

Default Font Styles and ID Numbers					
Font ID #	Font type	Size	Font ID #	Font type	Size
1	Courier New	9	19	Arial	9
2	Courier New	12	20	Arial	10
3	Courier New	18	21	Arial	12
4	Courier New	26	22	Arial	14
5	Courier New	32	23	Arial	16
6	Courier New	18	24	Arial	18
7	Courier New	26	25	Arial	20
8	Courier New	34	26	Arial	24
9	AMX Bold	14	27	Arial	36
10	AMX Bold	20	28	Arial Bold	10
11	AMX Bold	36	29	Arial Bold	8
			32 - Variable Fonts start at 32.		

You must import fonts into a TPDesign4 project file. The font ID numbers are assigned by TPDesign4. These values are also listed in the ***Generate Programmer's Report****.*

Border Styles and Programming Numbers

Border styles can be used to program borders on buttons, sliders, and popup pages.

Border Styles and Programming Numbers			
No.	Border styles	No.	Border styles
0-1	No border	10-11	Picture frame
2	Single line	12	Double line
3	Double line	20	Bevel-S
4	Quad line	21	Bevel-M
5-6	Circle 15	22-23	Circle 15
7	Single line	24-27	Neon inactive-S
8	Double line	40-41	Diamond 55
9	Quad line		

The TPDesign4 Touch Panel Design program has pre-set border styles that are user selectable.

You cannot use the following number values for programming purposes when changing border styles. TPD4 border styles can ONLY be changed by using the name.

TPD4 Border Styles by Name			
No.	Border styles	No.	Border styles
1	None	22	Circle 155
2	AMX Elite -L	23	Circle 165
3	AMX Elite -M	24	Circle 175
4	AMX Elite -S	25	Circle 185
5	Bevel -L	26	Circle 195
6	Bevel -M	27	Cursor Bottom
7	Bevel -S	28	Cursor Bottom with Hole
8	Circle 15	29	Cursor Top
9	Circle 25	30	Cursor Top with Hole
10	Circle 35	31	Cursor Left
11	Circle 45	32	Cursor Left with Hole
12	Circle 55	33	Cursor Right
13	Circle 65	34	Cursor Right with Hole
14	Circle 75	35	Custom Frame
15	Circle 85	36	Diamond 15
16	Circle 95	37	Diamond 25
17	Circle 105	38	Diamond 35
18	Circle 115	39	Diamond 45
19	Circle 125	40	Diamond 55
20	Circle 135	41	Diamond 65
21	Circle 145	42	Diamond 75
43	Diamond 85	85	Menu Bottom Rounded 65
44	Diamond 95	86	Menu Bottom Rounded 75
45	Diamond 105	87	Menu Bottom Rounded 85
46	Diamond 115	88	Menu Bottom Rounded 95
47	Diamond 125	89	Menu Bottom Rounded 105
48	Diamond 135	90	Menu Bottom Rounded 115

TPD4 Border Styles by Name (Cont.)			
No.	Border styles	No.	Border styles
49	Diamond 145	99	Menu Top Rounded 15
50	Diamond 155	100	Menu Top Rounded 25
51	Diamond 165	101	Menu Top Rounded 35
52	Diamond 175	102	Menu Top Rounded 45
53	Diamond 185	103	Menu Top Rounded 55
54	Diamond 195	104	Menu Top Rounded 65
55	Double Bevel -L	106	Menu Top Rounded 85
56	Double Bevel -M	107	Menu Top Rounded 95
57	Double Bevel -S	108	Menu Top Rounded 105
58	Double Line	109	Menu Top Rounded 115
59	Fuzzy	110	Menu Top Rounded 125
60	Glow-L	111	Menu Top Rounded 135
61	Glow-S	112	Menu Top Rounded 145
62	Help Down	113	Menu Top Rounded 155
63	Neon Active -L	114	Menu Top Rounded 165
64	Neon Active -S	115	Menu Top Rounded 175
65	Neon Inactive -L	116	Menu Top Rounded 185
66	Neon Inactive -S	118	Menu Right Rounded 15
67	Oval H 60x30	119	Menu Right Rounded 25
68	Oval H 100x50	120	Menu Right Rounded 35
69	Oval H 150x75	121	Menu Right Rounded 45
70	Oval H 200x100	122	Menu Right Rounded 55
71	Oval V 30x60	123	Menu Right Rounded 65
72	Oval V 50x100	124	Menu Right Rounded 75
73	Oval V 75x150	125	Menu Right Rounded 85
74	Oval V 100x200	126	Menu Right Rounded 95
75	Picture Frame	127	Menu Right Rounded 105
76	Quad Line	128	Menu Right Rounded 115
77	Single Line	129	Menu Right Rounded 125
78	Windows Style Popup	130	Menu Right Rounded 135
79	Windows Style Popup (Status Bar)	131	Menu Right Rounded 145
80	Menu Bottom Rounded 15	132	Menu Right Rounded 155
81	Menu Bottom Rounded 25	133	Menu Right Rounded 165
82	Menu Bottom Rounded 35	134	Menu Right Rounded 175
83	Menu Bottom Rounded 45	135	Menu Right Rounded 185
84	Menu Bottom Rounded 55	136	Menu Right Rounded 195
91	Menu Bottom Rounded 125	137	Menu Left Rounded 15
92	Menu Bottom Rounded 135	138	Menu Left Rounded 25
93	Menu Bottom Rounded 145	139	Menu Left Rounded 35
94	Menu Bottom Rounded 155	140	Menu Left Rounded 45
95	Menu Bottom Rounded 165	141	Menu Left Rounded 55
96	Menu Bottom Rounded 175	142	Menu Left Rounded 65
97	Menu Bottom Rounded 185	143	Menu Left Rounded 75
98	Menu Bottom Rounded 195	144	Menu Left Rounded 85

TPD4 Border Styles by Name (Cont.)			
No.	Border styles	No.	Border styles
145	Menu Left Rounded 95	151	Menu Left Rounded 155
146	Menu Left Rounded 105	152	Menu Left Rounded 165
147	Menu Left Rounded 115	153	Menu Left Rounded 175
148	Menu Left Rounded 125	154	Menu Left Rounded 185
149	Menu Left Rounded 135	155	Menu Left Rounded 195
150	Menu Left Rounded 145		

"^" Button Commands

These Button Commands are used in NetLinx Studio and are case insensitive.

All commands that begin with "^" have the capability of assigning a variable text address range and button state range. **A device must first be defined in the NetLinx programming language with values for the Device: Port : System** (in all programming examples - ***Panel*** is used in place of these values).

- **Variable text ranges** allow you to target 1 or more variable text channels in a single command.
- **Button State ranges** allow you to target 1 or more states of a variable text button with a single command.
- **"."** Character is used for the 'through' notation, also the "**&**" character is used for the 'And' notation.

"^" Button Commands	

^ANI
Run a button animation (in 1/10 second).
	Syntax:
	`"'^ANI-<vt addr range>,<start state>,<end state>,<time>'"`
	Variable:
	variable text address range = 1 - 4000.
	start state = Beginning of button state (0= current state).
	end state = End of button state.
	time = In 1/10 second intervals.
	Example:
	`SEND_COMMAND Panel,"'^ANI-500,1,25,100'"`
	Runs a button animation at text range 500 from state 1 to state 25 for 10 second.

^APF
Add page flip action to a button if it does not already exist.
	Syntax:
	`"'^APF-<vt addr range>,<page flip action>,<page name>'"`
	Variable:
	variable text address range = 1 - 4000.
	page flip action = **Stan**[dardPage] - Flip to standard page
	Prev[iousPage] - Flip to previous page
	Show[Popup] - Show Popup page
	Hide[Popup] - Hide Popup page
	Togg[lePopup] - Toggle popup state
	ClearG[roup] - Clear popup page group from all pages
	ClearP[age] - Clear all popup pages from a page with the specified page name
	ClearA[ll] - Clear all popup pages from all pages
	page name = 1 - 50 ASCII characters.
	Example:
	`SEND COMMAND Panel,"'^APF-400,Stan,Main Page'"`
	Assigns a button to a standard page flip with page name 'Main Page'.

"^" Button Commands (Cont.)	

^BAT
Append non-unicode text.
	Syntax:
	`"'^BAT-<vt addr range>,<button states range>,<new text>'"`
	Variable:
	variable text address range = 1 - 4000.
	button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
	new text = 1 - 50 ASCII characters.
	Example:
	`SEND_COMMAND Panel,"'^BAT-520,1,Enter City'"`
	Appends the text 'Enter City' to the button's OFF state.

^BAU
Append unicode text.
	Same format as ^UNI.
	Syntax:
	`"'^BAU-<vt addr range>,<button states range>,<unicode text>'"`
	Variable:
	variable text address range = 1 - 4000.
	button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
	unicode text = 1 - 50 ASCII characters. Unicode characters must be entered in Hex format.
	Example:
	`SEND_COMMAND Panel,"'^BAU-520,1,00770062'"`
	Appends Unicode text '00770062' to the button's OFF state.

^BCB
Set the border color to the specified color.
	Only if the specified border color is not the same as the current color.
	Note: Color can be assigned by color name (without spaces), number or R,G,B value (RRGGBB or RRGGBBAA).
	Syntax:
	`"'^BCB-<vt addr range>,<button states range>,<color value>'"`
	Variable:
	variable text address range = 1 - 4000.
	button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
	color value = Refer to theRGB Values for all 88 Basic Colors table on page 101 for more information.
	Example:
	`SEND_COMMAND Panel,"'^BCB-500.504&510,1,12'"`
	Sets the Off state border color to 12 (Yellow). Colors can be set by Color Numbers, Color name, R,G,B,alpha colors (RRGGBBAA) and R, G & B colors values (RRGGBB).
	Refer to theRGB Values for all 88 Basic Colors table on page 101.

"^" Button Commands (Cont.)	

^BCF
Set the fill color to the specified color.
	Only if the specified fill color is not the same as the current color.
	Note: Color can be assigned by color name (without spaces), number or R,G,B value (RRGGBB or RRGGBBAA).
	Syntax:
	`"'^BCF-<vt addr range>,<button states range>,<color value>'"`
	Variable:
	variable text address range = 1 - 4000.
	button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
	color value = Refer to theRGB Values for all 88 Basic Colors table on page 101 for more information.
	Example:
	`SEND_COMMAND Panel,"'^BCF-500.504&510.515,1,12'"`
	`SEND_COMMAND Panel,"'^BCF-500.504&510.515,1,Yellow'"`
	`SEND_COMMAND Panel,"'^BCF-500.504&510.515,1,#F4EC0A63''"`
	`SEND_COMMAND Panel,"'^BCF-500.504&510.515,1,#F4EC0A'"`
	Sets the Off state fill color by color number. Colors can be set by Color Numbers, Color name, R,G,B,alpha colors (RRGGBBAA) and R, G & B colors values (RRGGBB).

^BCT
Set the text color to the specified color.
	Only if the specified text color is not the same as the current color.
	***Note**: Color can be assigned by color name (without spaces), number or R,G,B value (RRGGBB or RRGGBBAA).*
	Syntax:
	`"'^BCT-<vt addr range>,<button states range>,<color value>'"`
	Variable:
	variable text address range = 1 - 4000.
	button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
	color value = Refer to theRGB Values for all 88 Basic Colors table on page 101 for more information.
	Example:
	`SEND_COMMAND Panel,"'^BCT-500.504&510,1,12'"`
	Sets the Off state border color to 12 (Yellow). Colors can be set by Color Numbers, Color name, R,G,B,alpha colors (RRGGBBAA) and R, G & B colors values (RRGGBB).

^BDO
Set the button draw order.
	Determines what order each layer of the button is drawn.
	Syntax:
	`"'^BDO-<vt addr range>,<button states range>,<1-5><1-5><1-5><1-5><1-5>'"`
	Variable:
	variable text address range = 1 - 4000.
	button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
	layer assignments = Fill Layer = 1
	Image Layer = 2
	Icon Layer = 3
	Text Layer = 4
	Border Layer = 5
	***Note**: The layer assignments are from bottom to top. The default draw order is* **12345**.
	Example:
	`SEND_COMMAND Panel,"'^BDO-530,1&2,51432'"`
	Sets the button's variable text 530 ON/OFF state draw order (from bottom to top) to Border, Fill, Text, Icon, and Image.
	Example 2:
	`SEND_COMMAND Panel,"'^BDO-1,0,12345'"`
	Sets all states of a button back to its default drawing order.

"^" Button Commands (Cont.)	

^BFB
Set the feedback type of the button.
	ONLY works on General-type buttons.
	Syntax:
	`"'^BFB-<vt addr range>,<feedback type>'"`
	Variable:
	variable text address range = 1 - 4000.
	feedback type = (None, Channel, Invert, On (Always on), Momentary, and Blink).
	Example:
	`SEND_COMMAND Panel,"'^BFB-500,Momentary'"`
	Sets the Feedback type of the button to 'Momentary'.

^BIM
Set the input mask for the specified address.
	Syntax:
	`"'^BIM-<vt addr range>,<input mask>'"`
	Variable:
	variable text address range = 1 - 4000.
	input mask = Refer to the *Text Area Input Masking* section on page 158 for character types.
	Example:
	`SEND_COMMAND Panel,"'^BIM-500,AAAAAAAAAA'"`
	Sets the input mask to ten 'A' characters, that are required, to either a letter or digit **(entry is required).**

^BLN
Set the number of lines removed equally from the top and bottom of a composite video signal.
	The maximum number of lines to remove is 240. A value of 0 will display the incoming video signal unaffected. This command is used to scale non 4x3 video images into non 4x3 video buttons.
	Syntax:
	`"'^BLN-<vt addr range>,<button states range>,<number of lines>'"`
	Variable:
	variable text address range = 1 - 4000.
	button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
	number of lines = 0 - 240.
	Example:
	`SEND_COMMAND Panel,"'^BLN-500,55'"`
	Equally removes 55 lines from the top and 55 lines from the bottom of the video button.

"^" Button Commands (Cont.)	

^BMC
Button copy command. Copy attributes of the source button to all the destination buttons.
	Note that the source is a single button state. Each state must be copied as a separate command. The <codes> section represents what attributes will be copied. All codes are 2 char pairs that can be separated by comma, space, percent or just ran together.
	Syntax:
	`"'^BMC-<vt addr range>,<button states range>,<source port>,<source address>,<source state>,<codes>'"`
	Variable:
	variable text address range = 1 - 4000.
	button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
	• source port = 1 - 100.
	• source address = 1 - 4000.
	• source state = 1 - 256.
	codes:
	BM - Picture/Bitmap
	BR - Border
	CB - Border Color
	CF - Fill Color
	CT - Text Color
	EC - Text effect color
	EF - Text effect
	FT - Font
	IC - Icon
	JB - Bitmap alignment
	JI - Icon alignment
	JT - Text alignment
	LN - Lines of video removed
	OP - Opacity
	SO - Button Sound
	TX - Text
	VI - Video slot ID
	WW - Word wrap on/off
	Example:
	`SEND_COMMAND Panel,"'^BMC-425,1,1,500,1,BR'"`
	or
	`SEND_COMMAND Panel,"'^BMC-425,1,1,500,1,%BR'"`
	Copies the OFF state border of button with a variable text address of 500 onto the OFF state border of button with a variable text address of 425.
	Example 2:
	`SEND_COMMAND Panel,"'^BMC-150,1,1,315,1,%BR%FT%TX%BM%IC%CF%CT'"`
	Copies the OFF state border, font, Text, bitmap, icon, fill color and text color of the button with a variable text address of 315 onto the OFF state border, font, Text, bitmap, icon, fill color and text color of the button with a variable text address of 150.

"^" Button Commands (Cont.)	
^BMF Set any/all button parameters by sending embedded codes and data.	Syntax: "'^BMF-<vt addr range>,<button states range>,<data>'" Variables: variable text address char array = 1 - 4000. button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state). level range = 1 - 600 (level value is 1 - 65535). data: '%R<left>, <top>, <right>, <bottom>' = Set rectangle. '%B<border style>' = Set the border style name. See theBorder Styles and Programming Numbers table on page 104. '%B',<border 0-27,40,41> = Set the borer style number. See theBorder Styles and Programming Numbers table on page 104. '%DO<1-5><1-5><1-5><1-5><1-5> = Set the draw order. Listed from bottom to top. Refer to the ^BDO command on page 108 for more information. '%F',<font 1-8,10,11,20-29,32-xx> = Set the font. See theDefault Font Styles and ID Numbers table on page 103. '%F<font 01-08,10,11,20-29,32-xx>' = Set the font. See theDefault Font Styles and ID Numbers table on page 103. '%MI<mask image>' = Set the mask image. Refer to the ^BMI command on page 113 for more information. '%T<text >' = Set the text using ASCII characters (empty is clear). '%R = Sets button location and also resizes the button. Takes four parameters: left, top, right, bottom. '%P<bitmap>' = Set the picture/bitmap filename (empty is clear). '%I',<icon 01-9900, 0-clear>' = Set the icon using values of 01 - 9900 (icon numbers are assigned in the TPDesign4 Resource Manager tab - Slots section). '%I<icon 01-9900, 0-clear>' = Set the icon using values of 01 - 9900 (icon numbers are assigned in the TPDesign4 Resource Manager tab - Slots section). '%J',<alignment of text 1-9> = As shown the following telephone keypad alignment chart: 0 1 2 3 4 5 6 7 8 9 Zero can be used for an absolute position '%JT<alignment of text 0-9>' = As shown the above telephone keypad alignment chart, **BUT** the 0 (zero) is absolute and followed by **',<left>,<top>'** '%JB<alignment of bitmap/picture 0-9>' = As shown the above telephone keypad alignment chart BUT the 0 (zero) is absolute and followed by **',<left>,<top>'** '%JI<alignment of icon 0-9>' = As shown the above telephone keypad alignment chart, **BUT** the 0 (zero) is absolute and followed by **',<left>,<top>'**

"^" Button Commands (Cont.)	
^BMF (Cont.)	*For some of these commands and values, refer to* theRGB Values for all 88 Basic Colors table on page 101. '%CF<on fill color>' = Set Fill Color. '%CB<on border color>' = Set Border Color. '%CT<on text color>' = Set Text Color. '%SW<1 or 0>' = Show/hide a button. '%SO<sound>' = Set the button sound. '%EN<1 or 0>' = Enable/disable a button. '%WW<1 or 0>' = Word wrap ON/OFF. '%GH<bargraph hi>' = Set the bargraph upper limit. '%GL<bargraph low>' = Set the bargraph lower limit. '%GN<bargraph slider name>' = Set the bargraph slider name/Joystick cursor name. '%GC<bargraph slider color>' = Set the bargraph slider color/Joystick cursor color. '%GI<bargraph invert>' = Set the bargraph invert/noninvert or joystick coordinate (0,1,2,3). *^GIV* section on page 119 more information. '%GU<bargraph ramp up>' = Set the bargraph ramp up time in intervals of 1/10 second. '%GD<bargraph ramp down>' = Set the bargraph ramp down time in 1/10 second. '%GG<bargraph drag increment> = Set the bargraph drag increment. Refer to the ^GDI command on page 119 for more information. '%VI<video ON/OFF>' = Set the Video either ON (value=1) or OFF (value=0). '%OT<feedback type>' = Set the Feedback (Output) Type to one of the following: None, Channel,Invert, ON (Always ON), Momentary, or Blink. '%SM' = Submit a text for text area button. '%SF<1 or 0>' = Set the focus for text area button. '%OP<0-255>' = Set the button opacity to either Invisible (value=0) or Opaque (value=255). '%OP#<00-FF>' = Set the button opacity to either Invisible (value=00) or Opaque (value=FF). '%UN<Unicode text>' = Set the Unicode text. See the*^UNI* section on page 124 for the text format. '%LN<0-240>' = Set the lines of video being removed. *^BLN* section on page 109 for more information. '%EF<text effect name>' = Set the text effect. '%EC<text effect color>' = Set the text effect color. '%ML<max length>' = Set the maximum length of a text area. '%MK<input mask>' = Set the input mask of a text area. '%VL<0-1>' = Log-On/Log-Off the computer control connection '%VN<network name>' = Set network connection name. '%VP<password>' = Set the network connection password. Example: `SEND_COMMAND Panel,"'^BMF-500,1,%B10%CFRed%CB Blue %CTBlack%Ptest.png'"` Sets the button OFF state as well as the Border, Fill Color, Border Color, Text Color, and Bitmap.

"^" Button Commands (Cont.)	

^BMI
Set the button mask image.
	Mask image is used to crop a borderless button to a non-square shape. This is typically used with a bitmap.
	Syntax:
	`"'^BMI-<vt addr range>,<button states range>,<mask image>'"`
	Variable:
	variable text address range = 1 - 4000.
	button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
	mask image = Graphic file used.
	Example:
	`SEND_COMMAND Panel,"'^BMI-530,1&2,newMac.png'"`
	Sets the button with variable text 530 ON/OFF state mask image to 'newmac.png'.
	
	'"^BMI-<variable text address range>,<button states range>,<mask image>'"
	Set the Chameleon Image button property. See Working With Chameleon Images in TPD4 Help.
	Note: If the Border Style properties is set to something other than 'None', no visible change will occur. Setting the Border Style to 'None' via ^BOR or ^BMF..%B will reveal the Chameleon image.
	Syntax:
	`SEND_COMMAND <DEV>,"'^BMI-<vt addr range>,<button states range>,<mask image>'"`
	Variables:
	variable text address range = 1 - 4000.
	button states range = 1 - 256 for multi-state buttons
	(0 = All states, for General buttons 1 = Off state and 2 = On state).
	mask image = Chameleon used.
	Example:
	`SEND_COMMAND Panel,"'^BMI-530,1&2,newMac.png'"`
	Sets the button with variable text 530 ON/OFF state mask image to 'newmac.png'.

^BML
Set the maximum length of the text area button.
	If this value is set to zero (0) there is no max length. The maximum length available is 2000. This is only for a Text area input button and not for a Text area input masking button.
	Syntax:
	`"'^BML-<vt addr range>,<max length>'"`
	Variable:
	variable text address range = 1 - 4000.
	max length = 2000 (0=no max length).
	Example:
	`SEND_COMMAND Panel,"'^BML-500,20'"`
	Sets the maximum length of the text area input button to 20 characters.

^BMP
Assign a picture to those buttons with a defined address range.
	Syntax:
	`"'^BMP-<vt addr range>,<button states range>,<name of bitmap/picture>'"`
	Variable:
	variable text address range = 1 - 4000.
	button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
	name of bitmap/picture = 1 - 50 ASCII characters.
	Example:
	`SEND_COMMAND Panel,"'^BMP-500.504&510.515,1,bitmap.png'"`
	Sets the OFF state picture for the buttons with variable text ranges of 500-504 & 510-515.

"^" Button Commands (Cont.)	
^BNC Clear current TakeNote annotations.	Syntax: "'^BNC-<vt addr range>,<command value>'" Variable: variable text address range = 1 - 4000. command value = (0= clear, 1= clear all). Example: SEND_COMMAND Panel,"'^BNC-973,0'" Clears the annotation of the TakeNote button with variable text 973.
^BNN Set the TakeNote network name for the specified Addresses.	Syntax: "'^BNN-<vt addr range>,<network name>'" Variable: variable text address range = 1 - 4000. network name = Use a valid IP Address. Example: SEND_COMMAND Panel,"'^BNN-973,192.168.169.99'" Sets the TakeNote button network name to 192.168.169.99.
^BNP Set the TakeNote network password for the specified Addresses.	Syntax: "'^BNP-<vt addr range>,<network password>'" Variable: variable text address range = 1 - 4000. network password = Password for the network. Example: SEND_COMMAND Panel,"'^BNN-973,12345'" Sets the TakeNote button network password to 12345.
^BNT Set the TakeNote network port for the specified Addresses.	Syntax: "'^BNT-<vt addr range>,<network port>'" Variable: variable text address range = 1 - 4000. network port = 1 - 65535. Example: SEND_COMMAND Panel,"'^BNT-973,5000'" Sets the TakeNote button network port to 5000.
^BOP Set the button opacity.	The button opacity can be specified as a decimal between 0 - 255, where zero (0) is invisible and 255 is opaque, or as a HEX code, as used in the color commands by preceding the HEX code with the # sign. In this case, #00 becomes invisible and #FF becomes opaque. If the opacity is set to zero (0), this does not make the button inactive, only invisible. Syntax: "'^BOP-<vt addr range>,<button states range>,<button opacity>'" Variable: variable text address range = 1 - 4000. button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state). button opacity = 0 (invisible) - 255 (opaque). Example: SEND_COMMAND Panel,"'^BOP-500.504&510.515,1,200'" Example 2: SEND_COMMAND Panel,"'^BOP-500.504&510.515,1,#C8'" Both examples set the opacity of the buttons with the variable text range of 500-504 and 510-515 to 200.

"^" Button Commands (Cont.)	

^BOR
Set a border to a specific border style associated with a border value for those buttons with a defined address range.
	Refer to theBorder Styles and Programming Numbers table on page 104 for more information.
	Syntax:
	`"'^BOR-<vt addr range>,<border style name or border value>'"`
	Variable:
	variable text address range = 1 - 4000.
	border style name = Refer to theBorder Styles and Programming Numbers table on page 104.
	border value = 0 - 41.
	Examples:
	`SEND_COMMAND Panel,"'^BOR-500.504&510.515,10'"`
	Sets the border by number (#10) to those buttons with the variable text range of 500-504 & 510-515.
	`SEND_COMMAND Panel,"'^BOR-500.504&510,AMX Elite -M'"`
	Sets the border by name (AMX Elite) to those buttons with the variable text range of 500-504 & 510-515.
	The border style is available through the TPDesign4 border-style drop-down list. Refer to theTPD4 Border Styles by Name table on page 104 for more information.

^BOS
Set the button to display either a Video or Non-Video window.
	Syntax:
	`"'^BOS-<vt addr range>,<button states range>,<video state>'"`
	Variable:
	variable text address range = 1 - 4000.
	button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
	video state = Video Off = 0 and Video On = 1.
	Example:
	`SEND_COMMAND Panel,"'^BOS-500,1,1'"`
	Sets the button to display video.

^BPP
Set or clear the protected page flip flag of a button.
	Zero clears the flag.
	Syntax:
	`"'^BPP-<vt addr range>,<protected page flip flag value>'"`
	Variable:
	variable text address range = 1 - 4000.
	protected page flip flag value range = 0 - 4 (**0 clears the flag**).
	Example:
	`SEND_COMMAND Panel,"'^BPP-500,1'"`
	Sets the button to protected page flip flag 1 (sets it to password 1).

^BRD
Set the border of a button state/ states.
	Only if the specified border is not the same as the current border. The border names are available through the TPDesign4 border-name drop-down list.
	Syntax:
	`"'^BRD-<vt addr range>,<button states range>,<border name>'"`
	Variable:
	variable text address range = 1 - 4000.
	button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
	border name = Refer toBorder Styles and Programming Numbers table on page 104.
	Example:
	`SEND_COMMAND Panel,"'^BRD-500.504&510.515,1&2,Quad Line'"`
	Sets the border by name (Quad Line) to those buttons with the variable text range of 500-504 & 510-515.
	Refer to theTPD4 Border Styles by Name table on page 104.

"^" Button Commands (Cont.)	

^BSF
Set the focus to the text area.
	***Note**: Select one button at a time (single variable text address). Do not assign a variable text address range to set focus to multiple buttons. Only one variable text address can be in focus at a time.*
	Syntax:
	`"'^BSF-<vt addr range>,<selection value>'"`
	Variable:
	variable text address range = 1 - 4000.
	selection value = Unselect = 0 and select = 1.
	Example:
	`SEND_COMMAND Panel,"'^BSF-500,1'"`
	Sets the focus to the text area of the button.

^BSM
Submit text for text area buttons.
	This command causes the text areas to send their text as strings to the NetLinx Master.
	Syntax:
	`"'^BSM-<vt addr range>'"`
	Variable:
	variable text address range = 1 - 4000.
	Example:
	`SEND_COMMAND Panel,"'^BSM-500'"`
	Submits the text of the text area button.

^BSO
Set the sound played when a button is pressed.
	If the sound name is blank the sound is then cleared. If the sound name is not matched, the button sound is not changed.
	Syntax:
	`"'^BSO-<vt addr range>,<button states range>,<sound name>'"`
	Variable:
	variable text address range = 1 - 4000.
	button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
	sound name = (**blank** - sound cleared, **not matched** - button sound not changed).
	Example:
	`SEND_COMMAND Panel,"'^BSO-500,1&2,music.wav'"`
	Assigns the sound 'music.wav' to the button Off/On states.

^BSP
Set the button size and position.
	Set the button size and its position on the page.
	Syntax:
	`"'^BSP-<vt addr range>,<left>,<top>,<right>,<bottom>'"`
	Variable:
	variable text address range = 1 - 4000.
	left = left side of page.
	top = top of page.
	right = right side of page.
	bottom = bottom of page.
	Example:
	`SEND_COMMAND Panel,"'^BSP-530,left,top'"`
	Sets the button with variable text 530 in the left side top of page.

^BVL
Log-On/Log-Off the computer control connection.
	Syntax:
	`"'^BVL-<vt addr range>,<connection>'"`
	Variable:
	variable text address range = 1 - 4000.
	connection = 0 (Log-Off connection) and 1 (Log-On connection).
	Example:
	`SEND_COMMAND Panel,"'^BVL-500,0'"`
	Logs-off the computer control connection of the button.

"^" Button Commands (Cont.)	
^BVN Set the network name for the specified address.	Syntax: "'^BVN-<vt addr range>,<network name>'" Variable: variable text address range = 1 - 4000. network name = 1 - 50 ASCII characters. Example: SEND_COMMAND Panel,"'^BVN-500,191.191.191.191'" Sets the network name to '191.191.191.191' for the specific control button.
^BVP Set the network password for the specified address.	Syntax: "'^BVP-<vt addr range>,<network password>'" Variable: variable text address range = 1 - 4000. network password = 1 - 50 ASCII characters. Example: SEND_COMMAND Panel,"'^BVP-500,PCLOCK'" Sets the password to PCLOCK for the specific PC control button.
^BVT Set the computer control network port for the specified address.	Syntax: "'^BVT-<vt addr range>,<network port>'" Variable: variable text address range = 1 - 4000. network port = 1 - 65535. Example: SEND_COMMAND Panel,"'^BVT-500,5000'" Sets the network port to 5000.
^BWW Set the button word wrap feature to those buttons with a defined address range.	By default, word-wrap is Off. Syntax: "'^BWW-<vt addr range>,<button states range>,<word wrap>'" Variable: variable text address range = 1 - 4000. button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state). word wrap = (0=Off and 1=On). Default is Off. Example: SEND_COMMAND Panel,"'^BWW-500,1,1'" Sets the word wrap on for the button's Off state.
^CPF Clear all page flips from a button.	Syntax: "'^CPF-<vt addr range>'" Variable: variable text address range = 1 - 4000. Example: SEND_COMMAND Panel,"'^CPF-500'" Clears all page flips from the button.
^DLD Set the disable cradle LED flag.	Syntax: "'^DLD-<status>'" Variable: status = (**0**= cradle operates normally, **1**= forces the cradle LEDs to always be dim). Example: SEND_COMMAND Panel,"'^DLD-1'" Disables the cradle LEDs.

"^" Button Commands (Cont.)	
^DPF Delete page flips from button if it already exists.	Syntax: "'^DFP-<vt addr range>,<actions>,<page name>'" Variable: variable text address range = 1 - 4000. actions = **Stan**[dardPage] - Flip to standard page **Prev**[iousPage] - Flip to previous page **Show**[Popup] - Show Popup page **Hide**[Popup] - Hide Popup page **Togg**[lePopup] - Toggle popup state **ClearG**[roup] - Clear popup page group from all pages **ClearP**[age] - Clear all popup pages from a page with the specified page name **ClearA**[ll] - Clear all popup pages from all pages page name = 1 - 50 ASCII characters. Example: SEND COMMAND Panel,"'^DPF-409,Prev'" Deletes the assignment of a button from flipping to a previous page.
^DTO Sets the display timeout	Returned in Custom event. Value1=display timeout value (in seconds) Sets the timeout of the display.
^ENA Enable or disable buttons with a set variable text range.	Syntax: "'^ENA-<vt addr range>,<command value>'" Variable: variable text address range = 1 - 4000. command value = (0= disable, 1= enable) Example: SEND_COMMAND Panel,"'^ENA-500.504&510.515,0'" Disables button pushes on buttons with variable text range 500-504 & 510-515.
^FON Set a font to a specific Font ID value for those buttons with a defined address range.	Font ID numbers are generated by the TPDesign4 programmers report. Syntax: "'^FON-<vt addr range>,<button states range>,<font value>'" Variable: variable text address range = 1 - 4000. button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state). font value = range = 1 - XXX. Refer to theDefault Font Styles and ID Numbers table on page 103. Example: SEND_COMMAND Panel,"'^FON-500.504&510.515,1&2,4'" Sets the font size to font ID #4 for the On and Off states of buttons with the variable text range of 500-504 & 510-515.

The Font ID is generated by TPD4 and is located in TPD4 through the Main menu.
***Panel > Generate Programmer's Report >Text Only Format >Readme.txt**.*

"^" Button Commands (Cont.)	
^GDI Change the bargraph drag increment.	Syntax: "'^GDI-<vt addr range>,<bargraph drag increment>'" Variable: variable text address range = 1 - 4000. bargraph drag increment = The default drag increment is 256. Example: SEND_COMMAND Panel,"'^GDI-7,128'" Sets the bargraph with variable text 7 to a drag increment of 128.
^GIV Invert the joystick axis to move the origin to another corner.	Parameters 1,2, and 3 will cause a bargraph or slider to be inverted regardless of orientation. Their effect will be as described for joysticks. Syntax: "'^GIV-<vt addr range>,<joystick axis to invert>'" Variable: variable text address range = 1 - 4000. joystick axis to invert = 0 - 3. 0 1 2 3 0 = Normal 1 = Invert horizontal axis 2 = Invert vertical axis 3 = Invert both axis locations For a bargraph 1 = Invert, 0 = Non Invert Example: SEND_COMMAND Panel,"'^GIV-500,3'" Inverts the joystick axis origin to the bottom right corner.
^GLH Change the bargraph upper limit.	Syntax: "'^GLH-<vt addr range>,<bargraph hi>'" Variable: variable text address range = 1 - 4000. bargraph limit range = 1 - 65535 (*bargraph upper limit range*). Example: SEND_COMMAND Panel,"'^GLH-500,1000'" Changes the bargraph upper limit to 1000.
^GLL Change the bargraph lower limit.	Syntax: "'^GLL-<vt addr range>,<bargraph low>'" Variable: variable text address range = 1 - 4000. bargraph limit range = 1 - 65535 (*bargraph lower limit range*). Example: SEND_COMMAND Panel,"'^GLL-500,150'" Changes the bargraph lower limit to 150.
^GRD Change the bargraph ramp-down time in 1/10th of a second.	Syntax: "'^GRD-<vt addr range>,<bargraph ramp down time>'" Variable: variable text address range = 1 - 4000. bargraph ramp down time = In 1/10th of a second intervals. Example: SEND_COMMAND Panel,"'^GRD-500,200'" Changes the bargraph ramp down time to 20 seconds.

<table>
<tr><th colspan="2">"^" Button Commands (Cont.)</th></tr>
<tr><td>^GRU
Change the bargraph ramp-up time in 1/10th of a second.</td><td>Syntax:
"'^GRU-<vt addr range>,<bargraph ramp up time>'"
Variable:
variable text address range = 1 - 4000.
bargraph ramp up time = In 1/10th of a second intervals.
Example:
SEND_COMMAND Panel,"'^GRU-500,100'"
Changes the bargraph ramp up time to 10 seconds.</td></tr>
<tr><td>^GSC
Change the bargraph slider color or joystick cursor color.</td><td>A user can also assign the color by Name and R,G,B value (RRGGBB or RRGGBBAA).
Syntax:
"'^GSC-<vt addr range>,<color value>'"
Variable:
variable text address range = 1 - 4000.
color value = Refer to theRGB Values for all 88 Basic Colors table on page 101.
Example:
SEND_COMMAND Panel,"'^GSC-500,12'"
Changes the bargraph or joystick slider color to Yellow.</td></tr>
<tr><td>^GSN
Change the bargraph slider name or joystick cursor name.</td><td>Slider names and cursor names can be found in the TPDesign4 slider name and cursor drop-down list.
Syntax:
"'^GSN-<vt addr range>,<bargraph slider name>'"
Variable:
variable text address range = 1 - 4000.
bargraph slider name = See table below.
<table><tr><td colspan="3">Bargraph Slider Names:</td></tr><tr><td>None</td><td>Ball</td><td>Circle -L</td></tr><tr><td>Circle -M</td><td>Circle -S</td><td>Precision</td></tr><tr><td>Rectangle -L</td><td>Rectangle -M</td><td>Rectangle -S</td></tr><tr><td>Windows</td><td>Windows Active</td><td></td></tr><tr><td colspan="3">Joystick Cursor Names:</td></tr><tr><td>None</td><td>Arrow</td><td>Ball</td></tr><tr><td>Circle</td><td>Crosshairs</td><td>Gunsight</td></tr><tr><td>Hand</td><td>Metal</td><td>Spiral</td></tr><tr><td>Target</td><td>View Finder</td><td></td></tr></table>Example:
SEND_COMMAND Panel,"'^GSN-500,Ball'"
Changes the bargraph slider name or the Joystick cursor name to 'Ball'.</td></tr>
<tr><td>^ICO
Set the icon to a button.</td><td>Syntax:
"'^ICO-<vt addr range>,<button states range>,<icon index>'"
Variable:
variable text address range = 1 - 4000.
button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
icon index range = 0 - 9900 (a value of 0 is clear).
Example:
SEND_COMMAND Panel,"'^ICO-500.504&510.515,1&2,1'"
Sets the icon for On and Off states for buttons with variable text ranges of 500-504 & 510-515.</td></tr>
</table>

<table>
<tr><th colspan="2">"^" Button Commands (Cont.)</th></tr>
<tr><td>^IRM
Set the IR channel.</td><td>Pulse the given IR channel for onTime in tenths of seconds. Delay offTime in tenths of a second before the next IR pulse is allowed. ^IRM allows the command itself to specify the port number. ^IRM is needed because commands programmed on the panel itself can only be sent to a single port number. (currently this is defined as 1 only).
Note: The port number of the IR will be the port number assigned in TPD4.
Syntax:
<code>"'^IRM-<port>,<channel>,<onTime>,<offTime>'"</code>
Variable:
port = User-defined port on the device (panel).
channel = 1 - 255 (channel to pulse).
onTime = 1/10th of a second.
offTime = 1/10th of a second.
Example:
<code>SEND_COMMAND Panel,"'^IRM-10,5, 20, 10'"</code>
Sets the port 10 IR channel 5 on time to 1 second and off time to 2 seconds.</td></tr>
<tr><td>^JSB
Set bitmap/ picture alignment using a numeric keypad layout for those buttons with a defined address range.</td><td>The alignment of 0 is followed by ',<left>,<top>'. The left and top coordinates are relative to the upper left corner of the button.
Syntax:
<code>"'^JSB-<vt addr range>,<button states range>,<new text alignment>'"</code>
Variable:
variable text address range = 1 - 4000.
button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
new text alignment = Value of 1- 9 corresponds to the following locations:
0
1 2 3
4 5 6
7 8 9
Zero can be used for an absolute position
Example:
<code>SEND_COMMAND Panel,"'^JSB-500.504&510.515,1&2,1'"</code>
Sets the off/on state picture alignment to upper left corner for those buttons with variable text ranges of 500-504 & 510-515.</td></tr>
<tr><td>^JSI
Set icon alignment using a numeric keypad layout for those buttons with a defined address range.</td><td>The alignment of 0 is followed by ',<left>,<top>'. The left and top coordinates are relative to the upper left corner of the button.
Syntax:
<code>"'^JSI-<vt addr range>,<button states range>,<new icon alignment>'"</code>
Variable:
variable text address range = 1 - 4000.
button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
new icon alignment = Value of 1 - 9 corresponds to the following locations:
0
1 2 3
4 5 6
7 8 9
Zero can be used for an absolute position
Example:
<code>SEND_COMMAND Panel,"'^JSI-500.504&510.515,1&2,1'"</code>
Sets the Off/On state icon alignment to upper left corner for those buttons with variable text range of 500-504 & 510-515.</td></tr>
</table>

<table>
<tr><th colspan="2">"^" Button Commands (Cont.)</th></tr>
<tr><td>^JST
Set text alignment using a numeric keypad layout for those buttons with a defined address range.</td><td>The alignment of 0 is followed by ',<left>,<top>'. The left and top coordinates are relative to the upper left corner of the button.
Syntax:
"'^JST-<vt addr range>,<button states range>,<new text alignment>'"
Variable:
variable text address range = 1 - 4000.
button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
new text alignment = Value of 1 - 9 corresponds to the following locations:
0
<table><tr><td>1</td><td>2</td><td>3</td></tr><tr><td>4</td><td>5</td><td>6</td></tr><tr><td>7</td><td>8</td><td>9</td></tr></table>Zero can be used for an absolute position
Example:
SEND_COMMAND Panel,"'^JST-500.504&510.515,1&2,1'"
Sets the text alignment to the upper left corner for those buttons with variable text ranges of 500-504 & 510-515.</td></tr>
<tr><td>^MBT
Set the Mouse Button mode On for the virtual PC.</td><td>Syntax:
"'^MBT-<pass data>'"
Variable:
pass data:
0 = None
1 = Left
2 = Right
3 = Middle
Example:
SEND COMMAND Panel,"'^MBT-1'"
Sets the mouse button mode to 'Left Mouse Click'.</td></tr>
<tr><td>^MDC
Turn On the 'Mouse double-click' feature for the virtual PC.</td><td>Syntax:
"'^MDC'"
Example:
SEND COMMAND Panel,"'^MDC'"
Sets the mouse double-click for use with the virtual PC.</td></tr>
<tr><td>^RSS
Reset system settings</td><td>Syntax:
"'^RSS'"
Example:
SEND COMMAND Panel,"'^RSS'"
Resets the panel to factory defaults</td></tr>
<tr><td>^SAV
Save configuration values</td><td>Syntax:
"'^SAV'"
Example:
SEND COMMAND Panel,"'^SAV'"
Saves the current configuration values.</td></tr>
</table>

"^" Button Commands (Cont.)	

^SKT
Enable socket touch
	Syntax:
	`"'^SKT'"`
	Example:
	`SEND COMMAND Panel,"'^SKT'"`
	`Example:`
	`Press,34,203`
	`Release,34,21`
	`Move,30,20`
	Opens up a listening TCP socket on port specified by send_command (must be > 1023). User can connect to socket and read touch values for the panel. Format of the output is:
	<Press/Release/Move>,<x-coordinate>,<y-coordinate>

^SHO
Show or hide a button with a set variable text range.
	Syntax:
	`"'^SHO-<vt addr range>,<command value>'"`
	Variable:
	variable text address range = 1 - 4000.
	command value = (0= hide, 1= show).
	Example:
	`SEND_COMMAND Panel,"'^SHO-500.504&510.515,0'"`
	Hides buttons with variable text address range 500-504 & 510-515.

^STO
Set the timeout value for shutdown
	Syntax:
	`"'^STO'"`
	Example:
	`SEND COMMAND Panel,"'^STO'"`
	Sets the timeout value for shutting down the panel.

^TEC
Set the text effect color for the specified addresses/states to the specified color.
	The Text Effect is specified by name and can be found in TPD4. You can also assign the color by name or RGB value (RRGGBB or RRGGBBAA).
	Syntax:
	`"'^TEC-<vt addr range>,<button states range>,<color value>'"`
	Variable:
	variable text address range = 1 - 4000.
	button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
	color value = Refer to theRGB Values for all 88 Basic Colors table on page 101.
	Example:
	`SEND_COMMAND Panel,"'^TEC-500.504&510.515,1&2,12'"`
	Sets the text effect color to Very Light Yellow on buttons with variable text 500-504 and 510-515.

^TEF
Set the text effect.
	The Text Effect is specified by name and can be found in TPD4.
	Syntax:
	`"'^TEF-<vt addr range>,<button states range>,<text effect name>'"`
	Variable:
	variable text address range = 1 - 4000.
	button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
	text effect name = **Refer to theText Effects table on page 126 for a listing of text effect names**.
	Example:
	`SEND_COMMAND Panel,"'^TEF-500.504&510.515,1&2,Soft Drop Shadow 3'"`
	Sets the text effect to Soft Drop Shadow 3 for the button with variable text range 500-504 and 510-515.

"^" Button Commands (Cont.)	
^TOP Enables/disables touch output to Master	If enabled, Press/Move/Release events are sent to the Master as string events. Syntax: `"'^TOP-<state>'"` <state> is 0(disable) 1(presses/releases), 2(moves), 3(press/move/release). **Note:** Move should be used with caution. This setting can generate a significant amount of traffic to the master depending on user interaction. Example command: '"^TOP-1"' Example Response: "String Event: Text: Press,320,480" Example Response: "String Event: Text: Release,320,480"

^TXT
Assign a text string to those buttons with a defined address range.
	Sets Non-Unicode text.
	Syntax:
	`"'^TXT-<vt addr range>,<button states range>,<new text>'"`
	Variable:
	variable text address range = 1 - 4000.
	button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
	new text = 1 - 50 ASCII characters.
	Example:
	`SEND_COMMAND Panel,"'^TXT-500.504&510.515,1&2,Test Only'"`
	Sets the On and Off state text for buttons with the variable text ranges of 500-504 & 510-515.

^UNI
Set Unicode text.
	For the ^UNI command (%UN and ^BMF command), the Unicode text is sent as ASCII-HEX nibbles.
	Syntax:
	`"'^UNI-<vt addr range>,<button states range>,<unicode text>'"`
	Variable:
	variable text address range = 1 - 4000.
	button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
	unicode text = Unicode HEX value.
	Example:
	`SEND_COMMAND Panel,"'^UNI-500,1,0041'"`
	Sets the button's unicode character to 'A'.
	Note: To send the variable text 'A' in unicode to all states of the variable text button 1, (for which the character code is 0041 Hex), send the following command:
	`SEND_COMMAND TP,"'^UNI-1,0,0041'"`
	Note: Unicode is always represented in a HEX value. TPD4 generates (through the Text Enter Box dialog) unicode HEX values. Refer to the TPDesign4 Instruction Manual for more information.

^VTP Virtual Touch Press	Syntax: '"^VTP-<touch press>,<x>,<y>"' Variable: 0=Release 1=Press 2=Pulse. Simulates a touch/release/pulse at the given coordinate.

Miscellaneous MVP Strings back to the Master

The following two strings are sent by the MVP panel back to the communicating Master:

MVP Strings to Master	
undock <master>	This is sent to the target Master when the MVP is undocked. • If the panel has no information within the User Access Passwords list, 'none' is sent as a user. • If the undock button on the Protected Setup page is used, 'setup' is sent as a user. • This string can be disabled from within the firmware setup pages.
dock	This is sent to the target Master when the MVP is docked. • This string can be disabled from within the firmware setup pages.

MVP Panel Lock Passcode commands

These commands are used to maintain a passcode list. From certain panels a password must be entered to remove the panel from its cradle. Only the passcode is entered. The user is just for identifying the passcodes.

MVP Panel Lock Passcode Commands	

^LPC
Clear all users from the User Access Passwords list on the Password Setup page.
	Syntax:
	`"'^LPC'"`
	Example:
	`SEND_COMMAND Panel,"'^LPC'"`
	Clear all users from the User Access Password list on the Password Setup page. Refer to the *Password Settings Page* section on page 77 for more information.

^LPR
Remove a given user from the User Access Passwords list on the Password Setup page.
	Syntax:
	`"'^LPR-<user>'"`
	Variable:
	user = 1 - 50 ASCII characters.
	Example:
	`SEND_COMMAND Panel,"'^LPR-Robert'"`
	Remove user named 'Robert' from the User Access Password list on the Password Setup page. Refer to the*Password Settings Page* section on page 77 for more information.

^LPS
Set the user name and password.
	This command allows you to:
	1. Add a new user name and password OR
	2. Set the password for a given user.
	The user name and password combo is added to the User Access and/or Password list in the Password Setup page. The user name must be alphanumeric.
	Syntax:
	`"'^LPS-<user>,<passcode>'"`
	Variable:
	user = 1 - 50 ASCII characters.
	passcode = 1 - 50 ASCII characters.
	Example:
	`SEND_COMMAND Panel,"'^LPS-Manager,undock'"`
	Sets a new user name as "Manager" and the password to "undock".
	Example 2:
	`SEND_COMMAND Panel,"'^LPS-Manager,test'"`
	Changes the given user name password to "test".
	Refer to the*Password Settings Page* section on page 77 for more information.

Text Effects Names

The following is a listing of text effects names (associated with the **^TEF** command on page 123).

Text Effects		
• Glow -S	• Medium Drop Shadow 1	• Hard Drop Shadow 1
• Glow -M	• Medium Drop Shadow 2	• Hard Drop Shadow 2
• Glow -L	• Medium Drop Shadow 3	• Hard Drop Shadow 3
• Glow -X	• Medium Drop Shadow 4	• Hard Drop Shadow 4
• Outline -S	• Medium Drop Shadow 5	• Hard Drop Shadow 5
• Outline -M	• Medium Drop Shadow 6	• Hard Drop Shadow 6
• Outline -L	• Medium Drop Shadow 7	• Hard Drop Shadow 7
• Outline -X	• Medium Drop Shadow 8	• Hard Drop Shadow 8
• Soft Drop Shadow 1	• Medium Drop Shadow 1 with outline	• Hard Drop Shadow 1 with outline
• Soft Drop Shadow 2	• Medium Drop Shadow 2 with outline	• Hard Drop Shadow 2 with outline
• Soft Drop Shadow 3	• Medium Drop Shadow 3 with outline	• Hard Drop Shadow 3 with outline
• Soft Drop Shadow 4	• Medium Drop Shadow 4 with outline	• Hard Drop Shadow 4 with outline
• Soft Drop Shadow 5	• Medium Drop Shadow 5 with outline	• Hard Drop Shadow 5 with outline
• Soft Drop Shadow 6	• Medium Drop Shadow 6 with outline	• Hard Drop Shadow 6 with outline
• Soft Drop Shadow 7	• Medium Drop Shadow 7 with outline	• Hard Drop Shadow 7 with outline
• Soft Drop Shadow 8	• Medium Drop Shadow 8 with outline	• Hard Drop Shadow 8 with outline
• Soft Drop Shadow 1 with outline		
• Soft Drop Shadow 2 with outline		
• Soft Drop Shadow 3 with outline		
• Soft Drop Shadow 4 with outline		
• Soft Drop Shadow 5 with outline		
• Soft Drop Shadow 6 with outline		
• Soft Drop Shadow 7 with outline		
• Soft Drop Shadow 8 with outline		

Button Query Commands

Button Query commands reply back with a custom event. There will be one custom event for each button/state combination. Each query is assigned a unique custom event type. **The following example is for debug purposes only:**

```
NetLinx Example: CUSTOM_EVENT[device, Address, Custom event type]

DEFINE_EVENT
CUSTOM_EVENT[TP,529,1001]      // Text
CUSTOM_EVENT[TP,529,1002]      // Bitmap
CUSTOM_EVENT[TP,529,1003]      // Icon
CUSTOM_EVENT[TP,529,1004]      // Text Justification
CUSTOM_EVENT[TP,529,1005]      // Bitmap Justification
CUSTOM_EVENT[TP,529,1006]      // Icon Justification
CUSTOM_EVENT[TP,529,1007]      // Font
CUSTOM_EVENT[TP,529,1008]      // Text Effect Name
CUSTOM_EVENT[TP,529,1009]      // Text Effect Color
CUSTOM_EVENT[TP,529,1010]      // Word Wrap
CUSTOM_EVENT[TP,529,1011]      // ON state Border Color
CUSTOM_EVENT[TP,529,1012]      // ON state Fill Color
CUSTOM_EVENT[TP,529,1013]      // ON state Text Color
CUSTOM_EVENT[TP,529,1014]      // Border Name
CUSTOM_EVENT[TP,529,1015]      // Opacity


{
   Send_String 0,"'ButtonGet Id=',ITOA(CUSTOM.ID),' Type=',ITOA(CUSTOM.TYPE)"
   Send_String 0,"'Flag   =',ITOA(CUSTOM.FLAG)"
   Send_String 0,"'VALUE1 =',ITOA(CUSTOM.VALUE1)"
   Send_String 0,"'VALUE2 =',ITOA(CUSTOM.VALUE2)"
   Send_String 0,"'VALUE3 =',ITOA(CUSTOM.VALUE3)"
   Send_String 0,"'TEXT   =',CUSTOM.TEXT"
   Send_String 0,"'TEXT LENGTH =',ITOA(LENGTH_STRING(CUSTOM.TEXT))"
}
```

All custom events have the following 6 fields:

Custom Event Fields	
Field	Description
Uint Flag	0 means text is a standard string, 1 means Unicode encoded string
slong value1	button state number
slong value2	actual length of string (this is not encoded size)
slong value3	index of first character (usually 1 or same as optional index
string text	the text from the button
text length (string encode)	button text length

These fields are populated differently for each query command. The text length (String Encode) field is not used in any command.

Button Query Commands	

?BCB
Get the current border color.
	Syntax:
	`"'?BCB-<vt addr range>,<button states range>'"`
	Variable:
	variable text address range = 1 - 4000.
	button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
	custom event type **1011:**
	Flag - zero
	Value1 - Button state number
	Value2 - Actual length of string (should be 9)
	Value3 - Zero
	Text - Hex encoded color value (ex: #000000FF)
	Text length - Color name length (should be 9)
	Example:
	`SEND COMMAND Panel,"'?BCB-529,1'"`
	Gets the button 'OFF state' border color. information.
	The result sent to the Master would be:
	ButtonGet Id = 529 Type = 1011
	Flag = 0
	VALUE1 = 1
	VALUE2 = 9
	VALUE3 = 0
	TEXT = #222222FF
	TEXT LENGTH = 9

?BCF
Get the current fill color.
	Syntax:
	`"'?BCF-<vt addr range>,<button states range>'"`
	Variable:
	variable text address range = 1 - 4000.
	button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
	custom event type **1012:**
	Flag - Zero
	Value1 - Button state number
	Value2 - Actual length of string (should be 9)
	Value3 - Zero
	Text - Hex encoded color value (ex: #000000FF)
	Text length - Color name length (should be 9)
	Example:
	`SEND COMMAND Panel,"'?BCF-529,1'"`
	Gets the button 'OFF state' fill color information.
	The result sent to the Master would be:
	ButtonGet Id = 529 Type = 1012
	Flag = 0
	VALUE1 = 1
	VALUE2 = 9
	VALUE3 = 0
	TEXT = #FF8000FF
	TEXT LENGTH = 9

Button Query Commands (Cont.)	

?BCT
Get the current text color.
	Syntax:
	`"'?BCT-<vt addr range>,<button states range>'"`
	Variable:
	variable text address range = 1 - 4000.
	button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
	custom event type **1013:**
	Flag - Zero
	Value1 - Button state number
	Value2 - Actual length of string (should be 9)
	Value3 - Zero
	Text - Hex encoded color value (ex: #000000FF)
	Text length - Color name length (should be 9)
	Example:
	`SEND COMMAND Panel,"'?BCT-529,1'"`
	Gets the button 'OFF state' text color information.
	The result sent to Master would be:
	ButtonGet Id = 529 Type = 1013
	Flag = 0
	VALUE1 = 1
	VALUE2 = 9
	VALUE3 = 0
	TEXT = #FFFFFEFF
	TEXT LENGTH = 9

?BMP
Get the current bitmap name.
	Syntax:
	`"'?BMP-<vt addr range>,<button states range>'"`
	Variable:
	variable text address range = 1 - 4000.
	button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
	custom event type **1002:**
	Flag - Zero
	Value1 - Button state number
	Value2 - Actual length of string
	Value3 - Zero
	Text - String that represents the bitmap name
	Text length - Bitmap name text length (should be 9)
	Example:
	`SEND COMMAND Panel,"'?BMP-529,1'"`
	Gets the button 'OFF state' bitmap information.
	The result sent to the Master would be:
	ButtonGet Id = 529 Type = 1002
	Flag = 0
	VALUE1 = 1
	VALUE2 = 9
	VALUE3 = 0
	TEXT = Buggs.png
	TEXT LENGTH = 9

Button Query Commands (Cont.)	
?BOP Get the overall button opacity.	Syntax: "'?BOP-<vt addr range>,<button states range>'" Variable: variable text address range = 1 - 4000. button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state). custom event type **1015:** Flag - Zero Value1 - Button state number Value2 - Opacity Value3 - Zero Text - Blank Text length - Zero Example: SEND COMMAND Panel,"'?BOP-529,1'" Gets the button 'OFF state' opacity information. The result sent to the Master would be: ButtonGet Id = 529 Type = 1015 Flag = 0 VALUE1 = 1 VALUE2 = 200 VALUE3 = 0 TEXT = TEXT LENGTH = 0
?BRD Get the current border name.	Syntax: "'?BRD-<vt addr range>,<button states range>'" Variable: variable text address range = 1 - 4000. button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state). custom event type **1014:** Flag - Zero Value1 - Button state number Value2 - Actual length of string Value3 - Zero Text - String that represents border name Text length - Border name length Example: SEND COMMAND Panel,"'?BRD-529,1'" Gets the button 'OFF state' border information. The result sent to the Master would be: ButtonGet Id = 529 Type = 1014 Flag = 0 VALUE1 = 1 VALUE2 = 22 VALUE3 = 0 TEXT = Double Bevel Raised -L TEXT LENGTH = 22
?BRT Get the Panel Brightness value	Syntax: BRIT/@BRT-<brightness value> Variable: Value1=panel brightness value

Button Query Commands (Cont.)	

?BWW
Get the current word wrap flag status.
	Syntax:
	`"'?BWW-<vt addr range>,<button states range>'"`
	Variable:
	variable text address range = 1 - 4000.
	button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
	custom event type **1010:**
	Flag - Zero
	Value1 - Button state number
	Value2 - 0 = no word wrap, 1 = word wrap
	Value3 - Zero
	Text - Blank
	Text length - Zero
	Example:
	`SEND COMMAND Panel,"'?BWW-529,1'"`
	Gets the button 'OFF state' word wrap flag status information.
	The result sent to the Master would be:
	ButtonGet Id = 529 Type = 1010
	Flag = 0
	VALUE1 = 1
	VALUE2 = 1
	VALUE3 = 0
	TEXT =
	TEXT LENGTH = 0

?CHR Get the Charging Status value	Syntax: `?CHR-<charging status value>` Variable: Value1=status(not charging=off,1=charging) Value2=current (combined) battery level
?DTO Get the Display Time Out value	Syntax: `?DTO-<timeout value>` Variable: Value1=display timeout value (in seconds)
?FBC Frame buffer CRC	Syntax: `?FBC-<frame buffer value>` Variable: Returned in Custom event. Value1=CRC32 calculated on the panel's frame buffer Conducts a CRC (cyclic redundancy check) on the frame buffer.

Button Query Commands (Cont.)	
?FON Get the current font index.	Syntax: "'?FON-<vt addr range>,<button states range>'" Variable: variable text address range = 1 - 4000. button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state). custom event type **1007:** Flag - Zero Value1 - Button state number Value2 - Font index Value3 - Zero Text - Blank Text length - Zero Example: SEND COMMAND Panel,"'?FON-529,1'" Gets the button 'OFF state' font type index information. The result sent to the Master would be: ButtonGet Id = 529 Type = 1007 Flag = 0 VALUE1 = 1 VALUE2 = 72 VALUE3 = 0 TEXT = TEXT LENGTH = 0
?ICO Get the current icon index.	Syntax: "'?ICO-<vt addr range>,<button states range>'" Variable: variable text address range = 1 - 4000. button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state). custom event type **1003:** Flag - Zero Value1 - Button state number Value2 - Icon Index Value3 - Zero Text - Blank Text length - Zero Example: SEND COMMAND Panel,"'?ICO-529,1&2'" Gets the button 'OFF state' icon index information. The result sent to the Master would be: ButtonGet Id = 529 Type = 1003 Flag = 0 VALUE1 = 2 VALUE2 = 12 VALUE3 = 0 TEXT = TEXT LENGTH = 0

Button Query Commands (Cont.)	

?JSB
Get the current bitmap justification.
	Syntax:
	`"'?JSB-<vt addr range>,<button states range>'"`
	Variable:
	variable text address range = 1 - 4000.
	button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
	custom event type **1005:**
	Flag - Zero
	Value1 - Button state number
	Value2 - 1 - 9 justify
	Value3 - Zero
	Text - Blank
	Text length - Zero
	Example:
	`SEND COMMAND Panel,"'?JSB-529,1'"`
	Gets the button 'OFF state' bitmap justification information.
	The result sent to the Master would be:
	ButtonGet Id = 529 Type = 1005
	Flag = 0
	VALUE1 = 1
	VALUE2 = 5
	VALUE3 = 0
	TEXT =
	TEXT LENGTH = 0

?JSI
Get the current icon justification.
	Syntax:
	`"'?JSI-<vt addr range>,<button states range>'"`
	Variable:
	variable text address range = 1 - 4000.
	button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
	custom event type **1006:**
	Flag - Zero
	Value1 - Button state number
	Value2 - 1 - 9 justify
	Value3 - Zero
	Text - Blank
	Text length - Zero
	Example:
	`SEND COMMAND Panel,"'?JSI-529,1'"`
	Gets the button 'OFF state' icon justification information.
	The result sent to the Master would be:
	ButtonGet Id = 529 Type = 1006
	Flag = 0
	VALUE1 = 1
	VALUE2 = 6
	VALUE3 = 0
	TEXT =
	TEXT LENGTH = 0

Button Query Commands (Cont.)	
?JST Get the current text justification.	Syntax: "'?JST-<vt addr range>,<button states range>'" Variable: variable text address range = 1 - 4000. button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state). custom event type **1004:** Flag - Zero Value1 - Button state number Value2 - 1 - 9 justify Value3 - Zero Text - Blank Text length - Zero Example: SEND COMMAND Panel,"'?JST-529,1'" Gets the button 'OFF state' text justification information. The result sent to the Master would be: ButtonGet Id = 529 Type = 1004 Flag = 0 VALUE1 = 1 VALUE2 = 1 VALUE3 = 0 TEXT = TEXT LENGTH = 0
?LOG Dump XML Panel Logs	Syntax: "'?LOG'" Variable: Value 1 = 1 (which one of multiple events is this (1 based)) Value 2 = 5 (total number of events required to send this string) Value 3 = total size in bytes of string Text = XML output (1 of 5)
?MAC Get the current MAC address(es)	Syntax: "'?MAC'" Returned in Custom event. Text=Wired:00:60:9F:91:07:63,Wireless:00:02:E3:42:C9:58 Note: If only one MAC is available, then only one will be listed (without a comma).
?MUT Get the current Mute information	Syntax: "'?MUT-<Value1>'" Variable: Value1=button state(0=off, 1=on)
?PIF Get the current Panel Information	Syntax: Text=<Filesystem Info>,<RAM Info>,<Panel Start Time>

Button Query Commands (Cont.)	
?STA Dump XML Panel Stats	Syntax: `"'?STA'"` Returned in MULTIPLE Custom events (size of strings are limited per message). Values in Custom event will state the number of messages and how many total bytes of xml data. Value 1 = 1 (which one of multiple events is this (1 based)) Value 2 = 5 (total number of events required to send this string) Value 3 = total size in bytes of string Text = XML output (1 of 5) Example: <?xml version="1.0" ?> <PanelLogs> <Log> <Date>09-04-2008 THU 11:24:07</Date> <Name>MasterUrlConnect</Name> <Message>Connected to (Sys=303) Master cjc-master (URL Mode)</Message> </Log> </PanelLogs>
?STO Get the shutdown timeout information	Syntax: `?STO-<Shutdown Timeout Value>` Variable: Value1=shutdown timeout value (in minutes)

?TEC
Get the current text effect color.
	Syntax:
	`"'?TEC-<vt addr range>,<button states range>'"`
	Variable:
	variable text address range = 1 - 4000.
	button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
	custom event type **1009:**
	Flag - Zero
	Value1 - Button state number
	Value2 - Actual length of string (should be 9)
	Value3 - Zero
	Text - Hex encoded color value (ex: #000000FF)
	Text length - Color name length (should be 9)
	Example:
	`SEND COMMAND Panel,"'?TEC-529,1'"`
	Gets the button 'OFF state' text effect color information.
	The result sent to the Master would be:
	ButtonGet Id = 529 Type = 1009
	Flag = 0
	VALUE1 = 1
	VALUE2 = 9
	VALUE3 = 0
	TEXT = #5088F2AE
	TEXT LENGTH = 9

Button Query Commands (Cont.)	

?TEF
Get the current text effect name.
	Syntax:
	`"'?TEF-<vt addr range>,<button states range>'"`
	Variable:
	variable text address range = 1 - 4000.
	button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
	custom event type **1008:**
	Flag - Zero
	Value1 - Button state number
	Value2 - Actual length of string
	Value3 - Zero
	Text - String that represents the text effect name
	Text length - Text effect name length
	Example:
	`SEND COMMAND Panel,"'?TEF-529,1'"`
	Gets the button 'OFF state' text effect name information.
	The result sent to the Master would be:
	ButtonGet Id = 529 Type = 1008
	Flag = 0
	VALUE1 = 1
	VALUE2 = 18
	VALUE3 = 0
	TEXT = Hard Drop Shadow 3
	TEXT LENGTH = 18

?TXT
Get the current text information.
	Syntax:
	`"'?TXT-<vt addr range>,<button states range>,<optional index>'"`
	Variable:
	variable text address range = 1 - 4000.
	button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
	optional index = This is used if a string was too long to get back in one command. The reply will start at this index.
	custom event type **1001:**
	Flag - Zero
	Value1 - Button state number
	Value2 - Actual length of string
	Value3 - Index
	Text - Text from the button
	Text length - Button text length
	Example:
	`SEND COMMAND Panel,"'?TXT-529,1'"`
	Gets the button 'OFF state' text information.
	The result sent to the Master would be:
	ButtonGet Id = 529 Type = 1001
	Flag = 0
	VALUE1 = 1
	VALUE2 = 14
	VALUE3 = 1
	TEXT = This is a test
	TEXT LENGTH = 14

Button Query Commands (Cont.)	
?VOL Show the Master Volume information.	Syntax: `?VOL-<volume value>` Variable: Value1=master volume value
?WIF Show the Wireless Settings information	Syntax: `Text=<WAP MAC address>,<SSID>,Channel #` Variable: Value1=Link Quality (percent) Value2=Signal Strength (percentage)

Panel Runtime Operations

Serial Commands are used in the AxcessX Terminal Emulator mode. These commands are case insensitive.

Panel Runtime Operation Commands	

ABEEP
Output a single beep even if beep is Off.
	Syntax:
	`"'ABEEP'"`
	Example:
	`SEND COMMAND Panel,"'ABEEP'"`
	Outputs a beep of duration 1 beep even if beep is Off.

ADBEEP
Output a double beep even if beep is Off.
	Syntax:
	`"'ADBEEP'"`
	Example:
	`SEND COMMAND Panel,"'ADBEEP'"`
	Outputs a double beep even if beep is Off.

@AKB
Pop up the keyboard icon and initialize the text string to that specified.
	Keyboard string is set to null on power up and is stored until power is lost. The Prompt Text is optional.
	Syntax:
	`"'@AKB-<initial text>;<prompt text>'"`
	Variables:
	`initial text = 1 - 50 ASCII characters.`
	`prompt text = 1 - 50 ASCII characters.`
	Example:
	`SEND COMMAND Panel,"'@AKB-Texas;Enter State'"`
	Pops up the Keyboard and initializes the text string 'Texas' with prompt text 'Enter State'.

AKEYB
Pop up the keyboard icon and initialize the text string to that specified.
	Keyboard string is set to null on power up and is stored until power is lost.
	Syntax:
	`"'AKEYB-<initial text>'"`
	Variables:
	`initial text = 1 - 50 ASCII characters.`
	Example:
	`SEND COMMAND Panel,"'AKEYB-This is a Test'"`
	Pops up the Keyboard and initializes the text string 'This is a Test'.

AKEYP
Pop up the keypad icon and initialize the text string to that specified.
	The keypad string is set to null on power up and is stored until power is lost.
	Syntax:
	`"'AKEYP-<number string>'"`
	Variables:
	`number string = 0 - 9999.`
	Example:
	`SEND COMMAND Panel,"'AKEP-12345'"`
	Pops up the Keypad and initializes the text string '12345'.

Panel Runtime Operation Commands (Cont.)	

AKEYR
Remove the Keyboard/ Keypad.
	Remove keyboard or keypad that was displayed using 'AKEYB', 'AKEYP', 'PKEYP', @AKB, @AKP, @PKP, @EKP, or @TKP commands.
	Syntax:
	`"'AKEYR'"`
	Example:
	`SEND COMMAND Panel,"'AKEYR'"`
	Removes the Keyboard/Keypad.

@AKP
Pop up the keypad icon and initialize the text string to that specified.
	Keypad string is set to null on power up and is stored until power is lost. The Prompt Text is optional.
	Syntax:
	`"'@AKP-<initial text>;<prompt text>'"`
	Variables:
	`initial text = 1 - 50 ASCII characters.`
	`prompt text = 1 - 50 ASCII characters.`
	Example:
	`SEND COMMAND Panel,"'@AKP-12345678;ENTER PASSWORD'"`
	Pops up the Keypad and initializes the text string '12345678' with prompt text 'ENTER PASSWORD'.

@AKR
Remove the Keyboard/ Keypad.
	Remove keyboard or keypad that was displayed using 'AKEYB', 'AKEYP', 'PKEYP', @AKB, @AKP, @PKP, @EKP, or @TKP commands.
	Syntax:
	`"'@AKR'"`
	Example:
	`SEND COMMAND Panel,"'@AKR'"`
	Removes the Keyboard/Keypad.

BEEP
Output a beep.
	Syntax:
	`"'BEEP'"`
	Example:
	`SEND COMMAND Panel,"'BEEP'"`
	Outputs a beep.

BRIT
Set the panel brightness.
	Syntax:
	`"'BRIT-<brightness level>'"`
	Variable:
	brightness level = 0 - 100.
	Example:
	`SEND COMMAND Panel,"'BRIT-50'"`
	Sets the brightness level to 50.

@BRT
Set the panel brightness.
	Syntax:
	`"'@BRT-<brightness level>'"`
	Variable:
	brightness level = 0 - 100.
	Example:
	`SEND COMMAND Panel,"'@BRT-70'"`
	Sets the brightness level to 70.

DBEEP
Output a double beep.
	Syntax:
	`"'DBEEP'"`
	Example:
	`SEND COMMAND Panel,"'DBEEP'"`
	Outputs a double beep.

Panel Runtime Operation Commands (Cont.)	

@EKP
Extend the Keypad.
	Pops up the keypad icon and initializes the text string to that specified. The Prompt Text is optional.
	Syntax:
	`"'@EKP-<initial text>;<prompt text>'"`
	Variables:
	`initial text = 1 - 50 ASCII characters.`
	`prompt text = 1 - 50 ASCII characters.`
	Example:
	`SEND COMMAND Panel,"'@EKP-33333333;Enter Password'"`
	Pops up the Keypad and initializes the text string '33333333' with prompt text 'Enter Password'.

PKEYP
Present a private keypad.
	Pops up the keypad icon and initializes the text string to that specified. Keypad displays a '*' instead of the numbers typed. The Prompt Text is optional.
	Syntax:
	`"'PKEYP-<initial text>'"`
	Variables:
	`initial text = 1 - 50 ASCII characters.`
	Example:
	`SEND COMMAND Panel,"'PKEYP-123456789'"`
	Pops up the Keypad and initializes the text string '123456789' in '*'.

@PKP
Present a private keypad.
	Pops up the keypad icon and initializes the text string to that specified. Keypad displays a '*' instead of the numbers typed. The Prompt Text is optional.
	Syntax:
	`"'@PKP-<initial text>;<prompt text>'"`
	Variables:
	`initial text = 1 - 50 ASCII characters.`
	`prompt text = 1 - 50 ASCII characters.`
	Example:
	`SEND COMMAND Panel,"'@PKP-1234567;ENTER PASSWORD'"`
	Pops up the Keypad and initializes the text string 'ENTER PASSWORD' in '*'.

SETUP
Send panel to SETUP page.
	Syntax:
	`"'SETUP'"`
	Example:
	`SEND COMMAND Panel,"'SETUP'"`
	Sends the panel to the Setup Page.

SHUTDOWN
Shut down the batteries providing power to the panel.
	Syntax:
	`"'SHUTDOWN'"`
	Example:
	`SEND COMMAND Panel,"'SHUTDOWN'"`
	Shuts-down the batteries feeding power to the panel. This function saves the battery from discharging.

SLEEP
Force the panel into screen saver mode.
	Syntax:
	`"'SLEEP'"`
	Example:
	`SEND COMMAND Panel,"'SLEEP'"`
	Forces the panel into screen saver mode.

Panel Runtime Operation Commands (Cont.)	

@SOU
Play a sound file.
	Syntax:
	`"'@SOU-<sound name>'"`
	Variables:
	`sound name = Name of the sound file. Supported sound file formats are: WAV & MP3.`
	Example:
	`SEND COMMAND Panel,"'@SOU-Music.wav'"`
	Plays the 'Music.wav' file.

@SSL
Change Sleep string.
	Syntax:
	`"'@SSL-<string>'"`
	Variables:
	`string = name of sleep string.`
	Example:
	`SEND COMMAND Panel,"'@SWK-SLEEPNOW'"`
	Changes the sleep string to SLEEPNOW.

@SST
Change Startup string.
	Syntax:
	`"'@SST-<string>'"`
	Variables:
	`string = name of startup string.`
	Example:
	`SEND COMMAND Panel,"'@SWK-STARTUPNOW'"`
	Changes the startup string to STARTUPNOW.

@SWK
Change Wakeup string.
	Syntax:
	`"'@SWK-<string>'"`
	Variables:
	`string = name of wakeup string.`
	Example:
	`SEND COMMAND Panel,"'@SWK-WAKEUPNOW'"`
	Changes the wakeup string to WAKEUPNOW.

@TKP
Present a telephone keypad.
	Pops up the keypad icon and initializes the text string to that specified. The Prompt Text is optional.
	Syntax:
	`"'@TKP-<initial text>;<prompt text>'"`
	Variables:
	`initial text = 1 - 50 ASCII characters.`
	`prompt text = 1 - 50 ASCII characters.`
	Example:
	`SEND COMMAND Panel,"'@TKP-999.222.1211;Enter Phone Number'"`
	Pops-up the Keypad and initializes the text string '999.222.1211' with prompt text 'Enter Phone Number'.

^TNC
Clears task note.
	Syntax:
	`"'^TNC'"`
	Example:
	`SEND COMMAND Panel,"'^TNC'"`
	Clears task note.

Panel Runtime Operation Commands (Cont.)	

TPAGEON
Turn On page tracking.
	This command turns On page tracking, whereby when the page or popups change, a string is sent to the Master. This string may be captured with a CREATE_BUFFER command for one panel and sent directly to another panel.
	Syntax:
	`"'TPAGEON'"`
	Example:
	`SEND COMMAND Panel,"'TPAGEON'"`
	Turns On page tracking.

TPAGEOFF
Turn Off page tracking.
	Syntax:
	`"'TPAGEOFF'"`
	Example:
	`SEND COMMAND Panel,"'TPAGEOFF'"`
	Turns Off page tracking.

@VKB
Popup the virtual keyboard.
	Syntax:
	`"'@VKB'"`
	Example:
	`SEND COMMAND Panel,"'@VKB'"`
	Pops-up the virtual keyboard.

WAKE
Force the panel out of screen saver mode.
	Syntax:
	`"'WAKE'"`
	Example:
	`SEND COMMAND Panel,"'WAKE'"`
	Forces the panel out of the screen saver mode.

Input Commands

These Send Commands are case insensitive.

Input Commands	

^CAL
Put panel in calibration mode.
	Syntax:
	`"'^CAL'"`
	Example:
	`SEND COMMAND Panel,"'^CAL'"`
	Puts the panel in calibration mode.

^KPS
Set the keyboard passthru.
	Syntax:
	`"'^KPS-<pass data>'"`
	Variable:
	pass data:
	<blank/empty> = Disables the keyboard.
	0 = Pass data to G4 application (default). This can be used with VPC or text areas.
	1 - 4 = Not used.
	5 = Sends out data to the Master.
	Example:
	`SEND COMMAND Panel,"'^KPS-5'"`
	Sets the keyboard passthru to the Master. Option 5 sends keystrokes directly to the Master via the Send Output String mechanism. This process sends a virtual keystroke command (^VKS) to the Master.
	Example 2:
	`SEND COMMAND Panel,"'^KPS-0'"`
	Disables the keyboard passthru to the Master.
	The following point defines how the parameters within this command work:
	• Accepts keystrokes from any of these sources: attached USB keyboard or Virtual keyboard.

Input Commands (Cont.)	

^MBT
Set the mouse button mode for the virtual PC.
	Syntax:
	`"'^MBT-<0-3>'"`
	Variable:
	0 = None.
	1 = Left.
	2 = Middle.
	3 = Right.
	Example:
	`SEND COMMAND Panel,"'^MBT-1'"`
	Sets the mouse button mode for the virtual PC to LEFT.

^MDC
Set the mouse double click ON for the virtual PC.
	Syntax:
	`"'^MDC'"`
	Example:
	`SEND COMMAND Panel,"'^MDC'"`
	Enables the double click for the virtual PC.

^MPS
Set mouse pass through. Allows mouse input to multiple destinations simultaneously. Destinations are comma delimited.
	Note: *This command causes all mice connected to the G4 product and any mice on a computer connected via a VGA card with USB output to reset to position 0,0.*
	Syntax:
	`"'^MPS-<0-6>,<0-6>,...'"`
	Variable:
	0 = Pass mouse input to G4 application.
	1-4 = Pass mouse input data to a VGA card with USP output for redirection to a computer.
	5 = Pass mouse buttons to the NetLinx master in the form of a custom event.
	6 = Pass mouse buttons and movement to the NetLinx master in the form of custom events.
	Example:
	`SEND COMMAND Panel,"'^MPS-0'"`
	Passes the mouse input to a connected G4 application.

^VKS
Send one or more virtual key strokes to the G4 application.
	Key presses and key releases are not distinguished except in the case of CTRL, ALT, and SHIFT.
	Refer to theEmbedded Codes table on page 143 that define special characters which can be included with the string but may not be represented by the ASCII character set.
	Syntax:
	`"'^VKS-<string>'"`
	Variable:
	string = Only 1 string per command/only one stroke per command.
	Example:
	`SEND COMMAND Panel,"'^VKS-'8"`
	Sends out the keystroke 'backspace' to the G4 application.

Embedded codes

The following is a list of G4 compatible embedded codes:

Embedded Codes		
Decimal numbers	Hexidecimal values	Virtual keystroke
8	($08)	Backspace
13	($0D)	Enter
27	($1B)	ESC
128	($80)	CTRL key down
129	($81)	ALT key down
130	($82)	Shift key down
131	($83)	F1
132	($84)	F2
133	($85)	F3
134	($86)	F4
135	($87)	F5
136	($88)	F6
137	($89)	F7
138	($8A)	F8
139	($8B)	F9
140	($8C)	F10
141	($8D)	F11
142	($8E)	F12
143	($8F)	Num Lock
144	($90)	Caps Lock
145	($91)	Insert
146	($92)	Delete
147	($93)	Home
148	($94)	End
149	($95)	Page Up
150	($96)	Page Down
151	($97)	Scroll Lock
152	($98)	Pause
153	($99)	Break
154	($9A)	Print Screen
155	($9B)	SYSRQ
156	($9C)	Tab
157	($9D)	Windows
158	($9E)	Menu
159	($9F)	Up Arrow
160	($A0)	Down Arrow
161	($A1)	Left Arrow
162	($A2)	Right Arrow
192	($C0)	CTRL key up
193	($C1)	ALT key up
194	($C2)	Shift key up

Panel Setup Commands

These commands are case insensitive.

Panel Setup Commands	
CLOCK Sets the time and date on the panel.	Syntax: "'CLOCK mm-dd-yy hh:mm:ss'" Variables: mm = Month dd = Day yy = Year hh = Hour mm = Minute ss = Second Example: SEND_COMMAND Panel, "'CLOCK 04-19-76 19:16:00'" Sets the time and date on the panel to April 19, 1976, 7:16 PM.
^CFE Enable or disable the image Flash backup cache	Syntax: "'^CFE-<0/1>'" Variables: 0 - for disable 1 - for enable Example: SEND_COMMAND Panel, "'^CFE-1'" Tells the cache manager to enable the Flash backup image cache.
^CPR Purge the cache when needed in the context of the running program.	Syntax: "'^CPR-<cache mask>'" Variables: cache mask: • 0x0001 - Purge non-volatile (Flash) image cache • 0x0002 - Purge RAM image cache • 0x0003 - Purge both non-volatile and RAM image caches Example: SEND_COMMAND Panel, "'^CPR-3'" Purges all images from both primary RAM cache and backup Flash cache.
^CFS Modifies the size of the backup image Flash cache.	Syntax: "'^CFS-<size in MB>'" Variable: size in MB - MB of allocated Flash memory Example: SEND_COMMAND Panel, "'^CFS-12'" Modifies the Flash cache size to 12MB. The space is not immediately allocated to the backup cache, it is consumed as needed for new entries in the Flash cache. If the size is reduced to something less than the size of the items currently stored in Flash cache, the least recently used items are deleted one by one until the used disk space is less than the maximum provided in the ^CFS command. If the size is larger than the maximum size allowed for the Flash cache (determined by taking 75% of free Flash space), the size reverts to the maximum size allowed.

Panel Setup Commands (Cont.)	
^CFSM Sets the Flash cache to the maximum available size allowed for backup Flash cache. (determined by taking 75% of free Flash space)	Syntax: "'^CFSM'" Variable: There is no parameter for this command. Example: SEND_COMMAND Panel, "'^CFSM'" Modifies the Flash cache size to the maximum available size for the device.
^CEX Changes the default expiration time for entries in the image cache (applies to both primary RAM cache and backup Flash cache). The default expiration time applies to dynamic images only.	Syntax: "'^CEX-<time index>'" Variable: time index: • 1 = 2 Hours • 2 = 8 Hours • 3 = 1 Day • 4 = 2 Days • 5 = 5 Days • 0 = NEVER Example: SEND_COMMAND Panel, "'^CEX-4'" Changes the default expiration time to 2 Days.
^DLD Set the disable cradle LED flag.	Syntax: "'^DLD-<0/1>'" Variables: 0 - LEDs operate normally 1 - Cradle LEDs operate dim setting only Example: SEND_COMMAND Panel, "'^DLD-1'" Sets the cradle LEDs to the dim setting.
^ICM-TALK **^ICM-LISTEN** Intercom modify command.	Intercom modify command. For backwards compatibility both versions are supported. In this release, however, the TALK and LISTEN subcommands are ignored. The microphone and/or speaker are activated based on the initial mode value of the intercom start command and the audio data packet flow is started upon receipt of this command by the panel. Syntax: SEND_COMMAND <DEV>,'"^ICM-TALK"' Variables: None. Example: SEND_COMMAND TP1,'"^ICM-TALK"'
^ICM-MUTEMIC Set the state of the microphone on a panel to muted (1) or unmuted (0). At the start of each call the microphone starts out unmuted.	Syntax: "'^ICM-MUTEMIC,<state>'" Variables: 0 - unmuted 1 - muted Example: SEND_COMMAND Panel, "^ICM-MUTEMIC,1" Sets the microphone to muted.

Panel Setup Commands (Cont.)	
^ICM-SPEAKERLEVEL Set the speaker level during an intercom call.	Syntax: "'^ICM-SPEAKERLEVEL,<level>'" Variables: 0 - 100 volume levels Example: SEND_COMMAND Panel, "^ICM-SPEAKERLEVEL,55" Sets the speaker volume level to 55.
^ICM-MICLEVEL Used to set the microphone level during an intercom call.	Syntax: "'^ICM-MICLEVEL,<level>'" Variables: 0 - 100 volume levels Example: SEND_COMMAND Panel, "^ICM-MICLEVEL,40" Sets the microphone volume level to 40.
^MUT Set the panel mute state.	Syntax: "'^MUT-<mute state>'" Variable: mute state= 0 = Mute Off and 1 = Mute On. Example: SEND_COMMAND Panel,"'^MUT-1'" Sets the panel's master volume to mute.
@PWD Set the page flip password.	@PWD sets the level 1 password only. Syntax: "'@PWD-<page flip password>'" Variables: page flip password = 1 - 50 ASCII characters. Example: SEND COMMAND Panel,"'@PWD-Main'" Sets the page flip password to 'Main'.
^PWD Set the page flip password.	Password level is required and must be 1 - 4. Syntax: "'^PWD-<password level>,<page flip password>'" Variables: password level = 1 - 4. page flip password = 1 - 50 ASCII characters. Example: SEND COMMAND Panel,"'^PWD-1,Main'" Sets the page flip password on Password Level 1 to 'Main'.
@RPP Reset the protected password.	@RPP resets the protected password to its default (1988). Syntax: "'@RPP'" Example: SEND COMMAND Panel,"'@RPP'" Resets the protected Setup page password to '1988'.
^VOL Set the panel volume.	Syntax: "'^VOL-<volume level>'" Variable: volume level = 0 - 100. ***100 is maximum volume setting.*** Example: SEND_COMMAND Panel,"'^VOL-50'" Set the panel volume to 50.

Dynamic Image Commands

The following table describes Dynamic Image Commands.

Dynamic Image Commands	

^BBR
Set the bitmap of a button to use a particular resource.
	Syntax:
	`"'^BBR-<vt addr range>,<button states range>,<resource name>'"`
	Variable:
	variable text address range = 1 - 4000.
	button states range = 1 - 256 for multi-state buttons (0 = All states, for General buttons 1 = Off state and 2 = On state).
	resource name = 1 - 50 ASCII characters.
	Example:
	`SEND_COMMAND Panel,"'^BBR-700,1,Sports_Image'"`
	Sets the resource name of the button to 'Sports_Image'.

^RAF
Add new resources.
	Adds any and all resource parameters by sending embedded codes and data.
	Since the embedded codes are preceded by a '%' character, any '%' character contained in the URL must be escaped with a second '%' character (see example).
	The file name field (indicated by a **%F** embedded code) may contain special escape sequences as shown in the *^RAF, ^RMF - Embedded Codes* table below.
	Syntax:
	`"'^RAF-<resource name>,<data>'"`
	Variables:
	•resource name = 1 - 50 ASCII characters.
	•data = Refers to the embedded codes, see the *^RAF, ^RMF - Embedded Codes* section on page 148.
	Example:
	`SEND_COMMAND Panel,"'^RAF-New Image,%P0%HAMX.COM%ALab/ Test%%5Ffile%Ftest.jpg'"`
	Adds a new resource.
	•The resource name is 'New Image'
	•%P (protocol) is an HTTP
	•%H (host name) is ***AMX.COM***
	•%A (file path) is ***Lab/Test_file***
	•%F (file name) is ***test.jpg***.
	Note that the **%%5F** in the file path is actually encoded as **%5F**.

^RFR
Force a refresh for a given resource.
	Syntax:
	`"'^RFR-<resource name>'"`
	Variable:
	resource name = 1 - 50 ASCII characters.
	Example:
	`SEND_COMMAND Panel,"'^RFR-Sports_Image'"`
	Forces a refresh on 'Sports_Image'.

^RFRP
Force a refresh for a given resource regardless of current view.
	This command can be used by programmers to prefetch images that will be needed soon.
	Syntax:
	`“'^RFRP-<resource name>'”`
	Variable:
	resource name = 1 - 50 ASCII characters.
	Example:
	`SEND_COMMAND Panel, “'^RFRP-DopplerRadarDFW'”`
	Performs an update or prefetch on the resource named “DopplerRadarDFW”, even if the image is not in the current view.

Dynamic Image Commands (Cont.)	

^RMF
Modify an existing resource.
	Modifies any and all resource parameters by sending embedded codes and data.
	Since the embedded codes are preceded by a '%' character, any '%' character contained in the URL must be escaped with a second '%' character (see example).
	The file name field (indicated by a **%F** embedded code) may contain special escape sequences as shown in the *^RAF, ^RMF - Embedded Codes* section on page 148.
	Syntax:
	`"'^RMF-<resource name>,<data>'"`
	Variables:
	•resource name = 1 - 50 ASCII characters
	•data = Refers to the embedded codes, see the *^RAF, ^RMF - Embedded Codes* section on page 148.
	Example:
	`SEND_COMMAND Panel,"'^RMF-Sports_Image,%ALab%%5FTest/Images%Ftest.jpg'"`
	Changes the resource 'Sports_Image' file name to 'test.jpg' and the path to 'Lab_Test/Images'.
	Note that the **%%5F** in the file path is actually encoded as **%5F**.

^RSR
Change the refresh rate for a given resource.
	Syntax:
	`"'^RSR-<resource name>,<refresh rate>'"`
	Variable:
	resource name = 1 - 50 ASCII characters.
	refresh rate = Measured in seconds.
	Example:
	`SEND_COMMAND Panel,"'^RSR-Sports_Image,5'"`
	Sets the refresh rate to 5 seconds for the given resource ('Sports_Image').

^RAF, ^RMF - Embedded Codes

The ^RAF and ^RMF commands add and modify any and all resource parameters by sending embedded codes and data:

```
"'^RAF-<resource name>,<data>'"
"'^RMF-<resource name>,<data>'"
```

The <data> variable uses the embedded codes described in the following table:

^RAF, ^RMF - Embedded Codes		
Parameter	Embedded Code	Description
protocol	'%P <0-1>'	Set protocol. HTTP (0) or FTP (1).
user	'%U <user>'	Set Username for authentication.
password	'%S <password>'	Set Password for authentication.
host	'%H <host>'	Set Host Name (fully qualified DNS or IP Address).
file	'%F <file>'	Full path to the location of the file or program that will return the resource. The path must be a valid HTTP URL minus the protocol and host. The only exception to this is the inclusion of special escape sequences and in the case of FTP protocol, regular expressions.
path	'%A <path>'	Set Directory path. The path must be a valid HTTP URL minus the protocol, host and filename. The only exception to this is the inclusion of special escape sequences and in the case of FTP protocol, regular expressions.
refresh	'%R <refresh 1-65535>'	The number of seconds between refreshes in which the resource is downloaded again. Refreshing a resource causes the button displaying that resource to refresh also. The default value is 0 (only download the resource once).

^RAF, ^RMF - Embedded Codes (Cont.)		
Parameter	Embedded Code	Description
newest	'%N <0-1>'	Set the newest file. A value of 1 means that only the most recent file matching the pattern is downloaded. ***Note**: The 'newest file' option only applies to FTP Dynamic Images, and only those that have pattern matching as part of their filename. Neither 'newest file' nor pattern matching apply to HTTP Dynamic Images.* *When set, the panel will first pull a list of files matching the given pattern from the specified FTP server and path. The timestamps of the items in the list will be compared, with the newest one being displayed on the panel. This is useful for source devices that place a uniquely named still image in a folder at constant intervals, allowing the panel always to display the most recent one.*
preserve	'%V <0-1>'	Set the value of the preserve flag. Default is 0. Currently preserve has no function.

Escape Sequences

The ^RAF and ^RMF commands support the replacement of any special escape sequences in the filename (specified by the **%F** embedded code) with the corresponding data obtained from the system as outlined in the table below:

Escape Sequences	
Sequence	Panel Information
$DV	Device Number
$SY	System Number
$IP	IP Address
$HN	Host Name
$MC	Mac Address
$ID	Neuron ID (*Only supported on panels that use ICSNet; ignored on all other panels*)
$PX	X resolution of current panel mode/file
$PY	Y resolution of current panel mode/file
$ST	Current state
$AC	Address code
$AP	Address port
$CC	Channel code
$CP	Channel port
$LC	Level code
$LP	Level port
$BX	X Resolution of Current button
$BY	Y Resolution of Current button
$BN	Name of Button

For instance, **http://www.amx.com/img.asp?device=$DV**

would become

http://www.amx.com/img.asp?device=10001.

Intercom Commands

The following is a listing and descriptions of panel intercom commands.

Intercom Commands	

^ICE
Ends an intercom call.
	Syntax:
	`"'^ICE'"`
	Example:
	`SEND_COMMAND Panel,"'^ICE'"`
	Ends a call.

^ICM
Modifies an intercom call.
	For backwards compatibility, both ^ICM-TALK and ^ICM-LISTEN are supported. In this release, however, the TALK and LISTEN subcommands are ignored. The microphone and/or speaker are activated based on the initial mode value of the intercom start command and the audio data packet flow is started upon receipt of this command by the panel.
	Syntax:
	`SEND_COMMAND <DEV>,"`^ICM-TALK`"`
	Variables:
	None.
	Example:
	`SEND_COMMAND TP1,"`^ICM-TALK`"`

^ICS
Starts an intercom call to the specified IP address and ports.
	^ICS-<IP>,<TX UDP port>,<RX UDP port>,<initial mode>"'
	Intercom start. Starts a call to the specified IP address and ports, where initial mode is either 1 (talk) or 0 (listen) or 2 (both). If no mode is specified 0 (listen) is assumed. Please note, however, that no data packets will actually flow until the intercom modify command is sent to the panel.
	Syntax:
	`SEND_COMMAND <DEV>,"'^ICS-<IP>,<TX UDP port>,<RX UDP port>,<initial mode>'"`
	Variables:
	IP = IP Address of panel to connect with on an Intercom call.
	TX UDP port = UDP port to transmit to.
	RX UDP port = UDP port to receive from.
	initial mode = 0 (listen) or 1 (talk) or 2 (handsfree). 0 is the default.
	Examples:
	Example of setting up a handsfree unicast call between two panels:
	`send_command TP1, "^ICS-192.168.0.3,9000,9002,2"`
	`send_command TP2, "^ICS-192.168.0.4,9002,9000,2"`
	Example of setting up a multicast call where the first panel is paging two other panels:
	`send_command TP1, "^ICS-239.252.1.1,9002,9000,1"`
	`send_command TP2, "^ICS-239.252.1.1,9002,9000,0"`
	`send_command TP3, "^ICS-239.252.1.1,9002,9000,0"`
	Example of setting up a baby monitor call where the first panel is listening to the microphone audio coming from the second panel:
	`send_command TP1, "^ICS-192.168.0.3,9000,9002,0"`
	`send_command TP2, "^ICS-192.168.0.4,9002,9000,1"`

^MODEL?
Gets the panel model name.
	Syntax:
	`"'^MODEL?'"`
	Example:
	`SEND_COMMAND Panel,"'^MODEL?'"`
	The panel (an MVP-8400i) responds with, ^MODEL-MVP-8400i

SIP Commands

The following table lists and describes SIP commands that are generated from the touch panel.

SIP Commands	
^PHN-AUTOANSWER Provides the state of the auto-answer feature.	Syntax: "'^PHN-AUTOANSWER, <state>'" Variable: state = 0 or 1 (off or on) Example: SEND_COMMAND Panel,"'^PHN-AUTOANSWER, 1'"
^PHN-CALL Provides call progress notification for a call.	Syntax: "'^PHN-CALL, <status>, <connection id>'" Variable: status = CONNECTED, DISCONNECTED, TRYING, RINGING, or HOLD. connection id = The identifying number of the connection. Example: SEND_COMMAND Panel"'^PHN-CALL, CONNECTED, 1'" Notifies that the call is connected.
^PHN-DECLINE Decline the incoming call.	Decline (send to voice mail if configured) the incoming call on <CallID> as indicated from the previous PHN-INCOMING message. CallID should be 0 or 1. Syntax: "'^PHN-DECLINE, <CallID>'" Variable: CallID = The identifying number of the connection. Example: SEND_COMMAND Panel,"'^PHN-DECLINE,0""
^PHN-INCOMING Provides incoming call notification.	Provides incoming call notification and the connection id used for all future commands related to this call. The connection id will be 0 or 1. Syntax: "'^PHN-INCOMING, <caller number>, <caller name>, <connection id>, <timestamp>, '" Variable: caller number = The phone number of the incoming call. caller name = The name associated with the caller number. connection id = The identifying number of the connection. timestamp = The current time in MM/DD/YY HH:MM:SS format. Example: SEND_COMMAND Panel,"'^PHN-INCOMING, 2125551000, AMX, 07/22/08 12:00:00, 1'"
^PHN-LINESTATE Indicates the current state of each of the available connections used to manage calls.	Syntax: "'^PHN-LINESTATE, <connection id>, <state>, <connection id>, <state>,...'" Variable: connection id = The identifying number of the connection. state = IDLE, HOLD, or CONNECTED extn = The local extension of this panel (see Example) Example: SEND_COMMAND Panel,"'^PHN-LINESTATE, 1, IDLE, 2, CONNECTED, SIP, <extn>'"

SIP Commands (Cont.)	
^PHN-MSGWAITING Indicates the number of messages waiting the user's voice mail box.	Syntax: "'^PHN-MSGWAITING, <messages>, <new message count>, <old message count>, <new urgent message count>, <old urgent message count>'" Variable: messages = 0 or 1 (1 indicates new messages) new message count = The number of new messages. old message count = The number of old messages. new urgent message count = The number of new messages marked urgent. old urgent message count = The number of old messages marked urgent. Example: SEND_COMMAND Panel,"'^PHN-MSGWAITING, 1, 1, 2, 1, 0'"
^PHN-PRIVACY Indicates the state of the privacy feature.	Syntax: "'^PHN-PRIVACY, <state>'" Variable: state = 0 (Disable) or 1 (Enable) new message count = The number of new messages. old message count = The number of old messages. new urgent message count = The number of new messages marked urgent. old urgent message count = The number of old messages marked urgent. Example: SEND_COMMAND Panel,"'^PHN-PRIVACY, 0'"
^PHN-REDIAL Indicates the panel is redialing the number.	Syntax: "'^PHN-REDIAL, <number>'" Variable: number = The phone number to dial. Example: SEND_COMMAND Panel,"'^PHN-REDIAL, 2125551000'"
^PHN-TRANSFERRED Indicates a call has been transferred.	Syntax: "'^PHN-TRANSFERRED'" Example: SEND_COMMAND Panel,"'^PHN-TRANSFERRED'"

The following table lists and describes SIP commands that are sent to the touch panel to manage calls.

SIP Commands	
^PHN-ANSWER Answers the call.	Syntax: "'^PHN-ANSWER, <connection id>'" Variable: connection id = The identifying number of the connection Example: SEND_COMMAND Panel,"'^PHN-ANSWER, 1'"
^PHN-AUTOANSWER Enables or disables the auto-answer feature of the phone.	Enables (1) or disables (0) the auto-answer feature on the phone. Syntax: "'^PHN-AUTOANSWER, <state>'" Variable: state = 0 (Disable) or 1 (Enable) Example: SEND_COMMAND Panel,"'^PHN-AUTOANSWER, 1'" Enables the auto-answer feature.

SIP Commands (Cont.)	
?PHN-AUTOANSWER Queries the state of the auto-answer feature.	The panel responds with the ^PHN-AUTOANSWER, <state> message. Syntax: "'?PHN-AUTOANSWER'" Example: SEND_COMMAND Panel,"'?PHN-AUTOANSWER'"
^PHN-CALL Calls the provided number.	Syntax: "'^PHN-CALL, <number>'" Variable: number = The provided phone number Example: SEND_COMMAND Panel,"'^PHN-CALL, 2125551000'"
^PHN-DTMF Sends DTMF codes.	Syntax: "'^PHN-DTMF, <DTMF code>'" Variable: DTMF code = 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, POUND, or ASTERISK. Example: SEND_COMMAND Panel,"'^PHN-DTMF, 1234567879ASTERISK'"
^PHN-HANGUP Hangs up the call.	Syntax: "'^PHN-HANGUP, <connection id>'" Variable: connection id = The identifying number of the connection Example: SEND_COMMAND Panel,"'^PHN-HANGUP, 1'"
^PHN-HOLD Places the call on hold.	Syntax: "'^PHN-HOLD, <connection id>'" Variable: connection id = The identifying number of the connection Example: SEND_COMMAND Panel,"'^PHN-HOLD, 1'"
?PHN-LINESTATE Queries the state of each of the connections used by the SIP device.	The panel responds with the ^PHN-LINESTATE message. Syntax: "'?PHN-LINESTATE'" Example: SEND_COMMAND Panel,"'?PHN-LINESTATE'"
^PHN-PRIVACY Enables or disables the privacy feature of the phone.	Enables or disables the privacy feature on the phone (do not disturb). Syntax: "'^PHN-PRIVACY, <state>'" Variable: state = 0 (Disable) or 1 (Enable) Example: SEND_COMMAND Panel,"'^PHN-PRIVACY, 1'" Enables the privacy feature.
?PHN-PRIVACY Queries the state of the privacy feature.	The panel responds with the ^PHN-PRIVACY, <state> message. Syntax: "'?PHN-PRIVACY'" Example: SEND_COMMAND Panel,"'?PHN-PRIVACY'"

SIP Commands (Cont.)	
^PHN-REDIAL Redials the last number.	Syntax: "'^PHN-REDIAL'" Example: SEND_COMMAND Panel,"'^PHN-REDIAL'"
^PHN-TRANSFER Transfers the call to the provided number.	Syntax: "'^PHN-TRANSFER, <connection id>, <number>'" Variable: connection id = The identifying number of the connection number = The number to which you want to transfer the call. Example: SEND_COMMAND Panel,"'^PHN-TRANSFER, 1, 2125551000'"

The following table lists and describes SIP setup commands. Using any of these commands causes the current user to go offline.

SIP Setup Commands	
^PHN-SETUP-DOMAIN Sets the realm for authentication.	Syntax: "'^PHN-SETUP-DOMAIN,<domain>'" Variable: domain = The realm used for authentication Example: SEND_COMMAND Panel,"'^PHN-SETUP-DOMAIN,asterisk'"
^PHN-SETUP-ENABLE Registers a new user	Once the configuration has been updated, the ENABLE command should be run to re-register the new user. Syntax: "'^PHN-SETUP-ENABLE'"
^PHN-SETUP-PASSWORD Sets the user password for the proxy server.	Syntax: "'^PHN-SETUP-PASSWORD,<password>'" Variable: password = The password for the user name Example: SEND_COMMAND Panel,"'^PHN-SETUP-PASSWORD,6003'"
^PHN-SETUP-PORT Sets the port number for the proxy server.	Syntax: "'^PHN-SETUP-PORT,<port>'" Variable: port = The port for the proxy server Example: SEND_COMMAND Panel,"'^PHN-SETUP-PORT,5060'"
^PHN-SETUP-PROXYADDR Sets the IP address for the proxy server.	Syntax: "'^PHN-SETUP-PROXYADDR,<IP>'" Variable: IP = The IP address for the proxy server Example: SEND_COMMAND Panel,"'^PHN-SETUP-PROXYADDR,192.168.223.111'"
^PHN-SETUP-STUNADDR Sets the IP address for the STUN server.	Syntax: "'^PHN-SETUP-STUNADDR,<IP>'" Variable: IP = The IP address for the STUN server Example: SEND_COMMAND Panel,"'^PHN-SETUP-STUNADDR,192.168.223.111'"

SIP Commands (Cont.)	

^PHN-SETUP-USERNAME
Sets the user name for authentication with the proxy server.
	Syntax:
	`"'^PHN-SETUP-USERNAME,<username>'"`
	Variable:
	username = The user name (usually the phone extension)
	Example:
	`SEND_COMMAND Panel,"'^PHN-SETUP-USERNAME,6003'"`

Appendix A: Text Formatting

Text Formatting Codes for Bargraphs/Joysticks

Text formatting codes for bargraphs provide a mechanism to allow a portion of a bargraphs text to be dynamically provided information about the current status of the level (multistate and traditional). These codes are entered into the text field along with any other text.

The following is a code list used for bargraphs:

Bargraph Text Code Inputs		
Code	Bargraph	Multi-State Bargraph
$P	Display the current percentage of the bargraph (derived from the Adjusted Level Value as it falls between the Range Values)	Display the current percentage of the bargraph (derived from the Adjusted Level Value as it falls between the Range Values)
$V	Raw Level Value	Raw Level Value
$L	Range Low Value	Range Low Value
$H	Range High Value	Range High Value
$S	N/A	Current State
$A	Adjusted Level Value (Range Low Value subtracted from the Raw Level Value)	Adjusted Level Value (Range Low Value subtracted from the Raw Level Value)
$R	Low Range subtracted from the High Range	Low Range subtracted from the High Range
$$	Dollar sign	Dollar sign

Buy changing the text on a button (via a VT command) you can modify the codes on a button. When one of the Text Formatting Codes is encountered by the firmware it is replaced with the correct value. These values are derived from the following operations:

Formatting Code Operations	
Code	Operation
$P	(Current Value - Range Low Value / Range High Value - Range Low Value) x 100
$V	Current Level Value
$L	Range Low Value
$H	Range High Value
$S	Current State (if regular bargraph then resolves to nothing)
$A	Current Value - Range Low Value
$R	Range High Value - Range Low Value

Given a current raw level value of 532, a range low value of 500 and a high range value of 600 the following text formatting codes would yield the following strings as shown in the table below:

Example	
Format	Display
$P%	32%
$A out of $R	32 out of 100
$A of 0 - $R	32 of 0 - 100
$V of $L - $H	532 of 500 - 600

Text Area Input Masking

Text Area Input Masking can be used to limit the allowed/correct characters that are entered into a text area. For example, in working with a zip code, a user could limit the entry to a max length of only 5 characters but, with input masking, you could limit them to 5 mandatory numerical digits and 4 optional numerical digits. A possible use for this feature is to enter information into form fields. The purpose of this feature is to:

- Force you to use correct type of characters (i.e. numbers vs. characters)
- Limit the number of characters in a text area
- Suggest proper format with fixed characters
- Right to Left
- Required or Optional
- Change/Force a Case
- Create multiple logical fields
- Specify range of characters/number for each field

With this feature, it is NOT necessary to:

- Limit you to a choice of selections
- Handle complex input tasks such as names, days of the week or month by name
- Perform complex validation such as Subnet Mask validation

Input mask character types

These character types define what information is allowed to be entered in any specific instance. The following table lists what characters in an input mask will define what characters are allowed in any given position.

Character Types	
Character	Masking Rule
0	Digit (0 to 9, entry required, plus [+] and minus [-] signs not allowed)
9	Digit or space (entry not required, plus and minus signs not allowed)
#	Digit or space (entry not required; plus and minus signs allowed)
L	Letter (A to Z, entry required)
?	Letter (A to Z, entry optional)
A	Letter or digit (entry required)
a	Letter or digit (entry optional)
&	Any character or a space (entry required)
C	Any character or a space (entry optional)

The number of the above characters used determines the length of the input masking box. Example: 0000 requires an entry, requires digits to be used, and allows only 4 characters to be entered/used.

Refer to the following Send Commands for more detailed information:

- `^BIM` - Sets the input mask for the specified addresses. (see the *^BIM* section on page 109).
- `^BMF` subcommand **`%MK`** - sets the input mask of a text area (see the *^BMF* section on page 111).

Input mask ranges

These ranges allow a user to specify the minimum and maximum numeric value for a field. ***Only one range is allowed per field. Using a range implies a numeric entry ONLY.***

Input Mask Ranges	
Character	Meaning
[	Start range
]	End range
|	Range Separator

An example from the above table:

[0|255] This allows a user to enter a value from 0 to 255.

Input mask next field characters

These characters allow you to specify a list of characters that cause the keyboard to move the focus to the next field when pressed instead of inserting the text into the text area.

Input Mask Next Field Char	
Character	Meaning
{	Start Next Field List
}	End Next Field List

An example from the above table:

{.} or {:} or {.:} Tells the system that after a user hits any of these keys, proceed to the next text area input box.

Input mask operations

Input Mask Operators change the behavior of the field in the following way:

Input Mask Operators	
Character	Meaning
<	Forces all characters to be converted to lowercase
>	Forces all characters to be converted to uppercase
^	Sets the overflow flag for this field

Input mask literals

To define a literal character, enter any character, other than those shown in the above table *(including spaces, and symbols)*. A back-slash ('\') causes the character that follows it to be displayed as the literal character. For example, **\A** is displayed just as the letter **A**. To define one of the following characters as a literal character, precede that character with a back-slash. Text entry operation using Input Masks.

A keyboard entry using normal text entry is straightforward. However, once an input mask is applied, the behavior of the keyboard needs to change to accommodate the input mask's requirement. When working with masks, any literal characters in the mask will be "skipped" by any cursor movement including cursor keys, backspace, and delete.

When operating with a mask, the mask should be displayed with placeholders. The "-" character should display where you should enter a character. The arrow keys will move between the "-" characters and allow you to replace them. The text entry code operates as if it is in the overwrite mode. If the cursor is positioned on a character already entered and you type in a new (and valid) character, the new character replaces the old character. There is no shifting of characters.

When working with ranges specified by the [] mask, the keyboard allows you to enter a number between the values listed in the ranges. If a user enters a value that is larger than the max, the maximum number of right-most characters is used to create a new, acceptable value.

- **Example 1**: If you type "125" into a field accepting 0-100, then the values displayed will be "1", "12", "25".
- **Example 2**: If the max for the field was 20, then the values displayed will be "1", "12", "5".

When data overflows from a numerical field, the overflow value is added to the previous field on the chain, **if** the overflow character was specified. In the above example, if the overflow flag was set, the first example will place the "1" into the previous logical field and the second example will place "12" in the previous logical field. If the overflow field already contains a value, the new value will be inserted to the right of the current characters and the overflow field will be

evaluated. Overflow continues to work until a field with no overflow value is set or there are no more fields left (i.e. reached first field).

If a character is typed and that character appears in the Next Field list, the keyboard should move the focus to the next field. For example, when entering time, a **":"** is used as a next field character. If you hit "1:2", the 1 is entered in the current field (hours) and then the focus is moved to the next field and 2 is entered in that field.

When entering time in a 12-hour format, entry of AM and PM is required. Instead of adding AM/PM to the input mask specification, the AM/PM should be handled within the NetLinx code. This allows a programmer to show/hide and provide discrete feedback for AM and PM.

Input mask output examples

The following are some common input masking examples:

Output Examples		
Common Name	Input Mask	Input
IP Address Quad	[0|255]{.}	Any value from 0 to 255
Hour	[1|12]{:}	Any value from 1 to 12
Minute/Second	[0|59]{:}	Any value from 0 to 59
Frames	[0|29]{:}	Any value from 0 to 29
Phone Numbers	(999) 000-0000	(555) 555-5555
Zip Code	00000-9999	75082-4567

URL Resources

A URL can be broken into several parts. For example: the URL *http://www.amx.com/company-info-home.asp*. This URL indicates that the protocol in use is **http** (HyperText Transport Protocol) and that the information resides on a host machine named **www.amx.com**. The image on that host machine is given an assignment (*by the program*) name of **company-info-home.asp** *(Active Server Page)*.

The exact meaning of this name on the host machine is both protocol dependent and host dependent. The information normally resides in a file, but it could be generated dynamically. This component of the URL is called the file component, even though the information is not necessarily in a file.

A URL can optionally specify a port, which is the port number to which the TCP/IP connection is made on the remote host machine. If the port is not specified, the default port for the protocol is used instead. For example, the default port for http is 80. An alternative port could be specified as: http://www.amx.com:8080/company-info-home.asp.

Any legal HTTP syntax can be used.

Special escape sequences

The system has only a limited knowledge of URL formats in that it transparently passes the URL information onto the server for translation. A user can then pass any parameters to the server side programs such as CGI scripts or active server pages. However; the system will parse the URL looking for special escape codes. When it finds an escape code it replaces that code with a particular piece of panel, button, or state information.
For example, "http://www.amx.com/img.asp?device=$DV" would become "http://www.amx.com/img.asp?device=10001". Other used escape sequences include:

Escape Sequences	
Sequence	Panel Information
$DV	Device Number
$SY	System Number
$IP	IP Address
$HN	Host Name
$MC	Mac Address
$ID	Neuron ID
$PX	X Resolution of current panel mode/file
$PY	Y Resolution of current panel mode/file
$BX	X Resolution of current button
$BY	Y Resolution of current button
$BN	Name of button
$ST	Current state
$AC	Address Code
$AP	Address Port
$CC	Channel Code
$CP	Channel Port
$LC	Level Code
$LP	Level Port

Appendix B - Wireless Technology

Overview of Wireless Technology

- **802.11b/2.4 GHz and 802.11a/5 GHz** are the two major WLAN standards and both operate using radio frequency (RF) technology. Together the two standards are together called Wi-If and operate in frequency bands of 2.4 GHz and 5 GHz respectively.
  The ***802.11b*** specification was the first to be finalized and reach the marketplace. The actual throughput you can expect to obtain from an 802.11b network will typically be between 4 and 5 Mbps.
  Because of the higher frequency (and thus shorter wavelength) that they use, ***802.11a*** signals have a much tougher time penetrating solid objects like walls, floors, and ceilings. As a result, the price for 802.11a's higher speed is not only shorter in range but also a weaker and less consistent signal.
  802.11g provides increased bandwidth at 54 Mbps. As part of the IEEE 802.11g specification, when throughput cannot be maintained, this card will automatically switch algorithms in order to maintain the highest spread possible at a given distance. In addition, 802.11g can also step down to utilize 802.11b algorithms and also maintain a connection at longer distances.
- IP Routing is a behavior of the wireless routing is largely dependent on the wired network interface. Although the panel can be connected to two networks simultaneously it may only have one gateway. If the wired network was successfully set up and a gateway was obtained; then the default route for all network traffic will be via the wired network. In the event that the wired network was not configured, then the default route for all network traffic will be via the wireless network. The wired network connection always takes priority.
  - As an example: Imagine a panel connected to two networks A & B. A is the wired network and B is the wireless network. If the Master controller is on either of these networks then it will be reached. However if the Master controller is on a different network, C, then determining which network interface (wired or wireless) that will be used is dependent on the gateway.
- **Wireless Access Points** are the cornerstone of any wireless network. A Wireless Access Point acts as a bridge between a wired and wireless network. It aggregates the traffic from all the wireless clients and forwards it down the network to the switch or router.
  One Wireless Access Point may be all you need. However, you could need more Wireless Access Points depending on either how large your installation is, how it is laid out, and how it is constructed.
- **Wireless Equivalent Privacy** (**WEP**) Security is a method by which WLANs protect wireless data streams. A data stream encrypted with WEP can still be intercepted or eavesdropped upon, but the encryption makes the data unintelligible to the interloper. The strength of WEP is measured by the length of the key used to encrypt the data. The longer the key, the harder it is to crack.
  802.11b implementations provided 64-bit and 128-bit WEP keys. This is known respectively as 64-bit and 128-bit WEP encryption. 64-bit is generally not regarded as adequate security protection. Both key lengths are supported by the Modero product line.
  Whichever level of WEP you use, it's ***crucial to use identical settings (CASE SENSITIVE)***--the key length, and the key itself-- on all devices. Only devices with common WEP settings will be able to communicate. Similarly, if one device has WEP enabled and another doesn't, they won't be able to talk to each other.

  Although the calculations required to encrypt data with WEP can impact the performance of your wireless network, it's generally seen only when running benchmarks, and not large enough to be noticeable in the course of normal network usage.

Terminology

- **802.1x**
  - IEEE 802.1x is an IEEE standard that is built on the Internet standard EAP (Extensible Authentication Protocol). 802.1x is a standard for passing EAP messages over either a wired or wireless LAN. Additionally, 802.1x is also responsible for communicating the method with which WAPs and wireless users can share and change encryption keys. This continuous key change helps resolve any major security vulnerabilities native to WEP.
- **AES**

- Short for Advanced Encryption Standard, is a cipher currently approved by the NSA to protect US Government documents classified as Top Secret. The AES cipher is the first cipher protecting Top Secret information available to the general public.

- **CERTIFICATES (CA)**
  - A certificate can have many forms, but at the most basic level, a certificate is an identity combined with a public key, and then signed by a certification authority. The certificate authority (CA) is a trusted external third party which "signs" or validates the certificate. When a certificate has been signed, it gains some cryptographic properties. AMX supports the following security certificates within three different formats:
    - **PEM** (Privacy Enhanced Mail)
    - **DER** (Distinguished Encoding Rules)
    - **PKCS12** (Public Key Cryptography Standard #12)
  - Typical certificate information can include the following items:
    - Certificate Issue Date
    - Extensions
    - Issuer
    - Public Key
    - Serial Number
    - Signature Algorithm
    - User
    - Version

- **MIC**
  - Short for Message Integrity Check, prevents forged packets from being sent. Through WEP it was possible to alter a packet whose content was known even if it had not been decrypted.

- **TKIP**
  - Short for Temporal Key Integration, is part of the IEEE 802.11i encryption standard for wireless LANs. TKIP provides per-packet key mixing, message integrity check and re-keying mechanism, thus ensuring every data packet is sent with its own unique encryption key. Key mixing increases the complexity of decoding the keys by giving the hacker much less data that has been encrypted using any one key.
- **WEP**
  - Short for Wired Equivalent Privacy (WEP), is a scheme used to secure wireless networks (Wi-Fi). A wireless network broadcasts messages using radio which are particularly susceptible to hacker attacks. WEP was intended to provide the confidentiality and security comparable to that of a traditional wired network. As a result of identified weaknesses in this scheme, WEP was superseded by Wi-Fi Protected Access (WPA), and then by the full IEEE 802.11i standard (also known as WPA2).
- **WPA**
  - Wi-Fi Protected Access (WPA and WPA2) is a class of system used to secure wireless (Wi-Fi) computer networks. It was created in response to several serious weaknesses researchers had found in the previous WEP system. WPA implements the majority of the IEEE 802.11i standard, and was intended as an intermediate measure to take the place of WEP while 802.11i was prepared (WPA2).
  - WPA is designed to work with all wireless network interface cards, but not necessarily with first generation wireless access points.
  - To resolve problems with WEP, the Wi-Fi Alliance released WPA (FIG. 75) which integrated **802.1x**, **TKIP** and **MIC**. Within the WPA specifications the RC4 cipher engine was maintained from WEP. RC4 is widely used in SSL (Secure Socket Layer) to protect internet traffic.

- **WPA2**
  - Also know as IEEE 802.11i, is an amendment to the 802.11 standard specifying security mechanisms for wireless networks. The 802.11i scheme makes use of the Advanced Encryption Standard (AES) block cipher; WEP and WPA use the RC4 stream cipher.

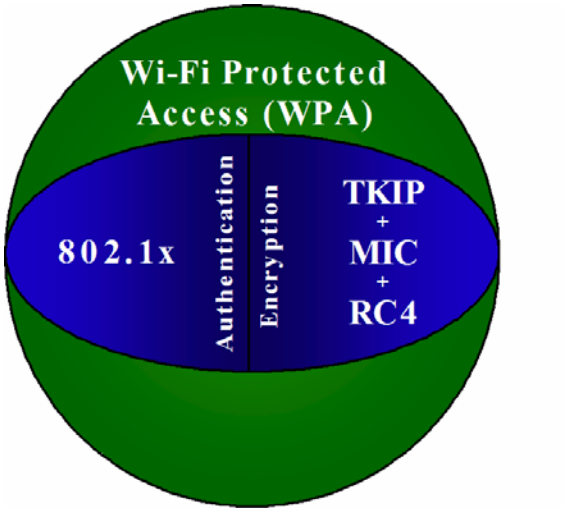


FIG. 75 WPA Overview

- The 802.11i architecture contains the following components: 802.1X for authentication (entailing the use of EAP and an authentication server), RSN for keeping track of associations, and AES-based CCMP to provide confidentiality, integrity and origin authentication.
- WPA2 implements the full standard, but will not work with some older network cards. Both provide good security, with two significant issues:
  - *either WPA or WPA2 must be enabled and chosen in preference to WEP. WEP is usually presented as the first security choice in most installation instructions.*
  - *in the "Personal" mode, the most likely choice for homes and small offices, a passphrase is required that, for full security, must be longer than the typical 6 to 8 character passwords users are taught to employ.*
- With the RC4 released to the general public the IEEE implemented the Advanced Encryption Standard (AES) as the cipher engine for 802.11i, which the Wi-Fi Alliance has branded as WPA2.

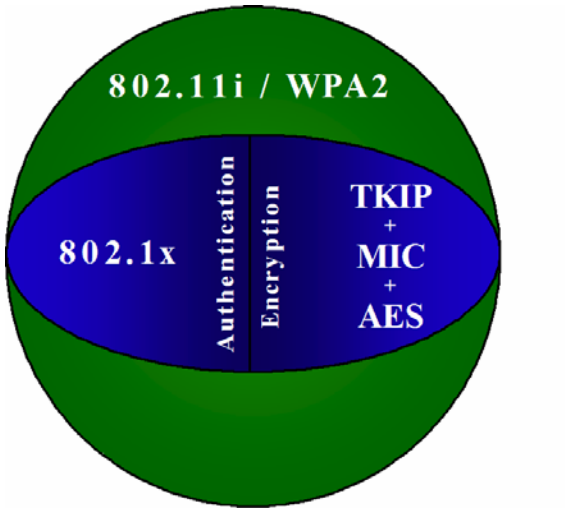


FIG. 76 WPA2 Overview

EAP Authentication

EAP (Extensible Authentication Protocol) is an Enterprise authentication protocol that can be used in both a wired and wireless network environment. EAP requires the use of an 802.1x Authentication Server, also known as a Radius server. Although there are currently over 40 different EAP methods defined, the current internal Modero 802.11g wireless card and accompanying firmware only support the following EAP methods (***listed from simplest to most complex***):

- EAP-LEAP (Cisco Light EAP)
- EAP-FAST (Cisco Flexible Authentication via Secure Tunneling, a.k.a. LEAPv2)

The following use certificates:

- EAP-PEAP (Protected EAP)
- EAP-TTLS (Tunneled Transport Layer Security)
- **EAP-TLS** (Transport Layer Security)

EAP requires the use of an 802.1x authentication server (also known as a Radius server). Sophisticated Access Points (such as Cisco) can use a built-in Radius server. The most common RADIUS servers used in wireless networks today are:

- Microsoft Sever 2003
- Juniper Odyssey (once called Funk Odyssey)
- Meetinghouse AEGIS Server
- DeviceScape RADIUS Server
- Cisco Secure ACS

EAP characteristics

The following table outlines the differences among the various EAP Methods from most secure (at the top) to the least secure (at the bottom of the list):

EAP Method Characteristics

Method:	Credential Type:	Authentication:	Pros:	Cons:
EAP-TLS	• Certificates	• Certificate is based on a two-way authentication	• Highest Security	• Difficult to deploy
EAP-TTLS	• Certificates • Fixed Passwords • One-time passwords (tokens)	• Client authentication is done via password and certificates • Server authentication is done via certificates	• High Security	• Moderately difficult to deploy
EAP-PEAP	• Certificates • Fixed Passwords • One-time passwords (tokens)	• Client authentication is done via password and certificates • Server authentication is done via certificates	• High Security	• Moderately difficult to deploy
EAP-LEAP	• Certificates • Fixed Passwords • One-time passwords (tokens)	• Authentication is based on MS-CHAP and MS-CHAPv2 authentication protocols	• Easy deployment	• Susceptible to dictionary attacks
EAP-FAST	• Certificates • Fixed Passwords • One-time passwords (tokens)	• N/A	• N/A	• N/A

EAP communication overview

EAP Authentication goes a step beyond just encrypting data transfers, but also requires that a set of credentials be validated before the client (panel) is allowed to connect to the rest of the network (FIG. 77). Below is a description of this process. It is important to note that there is no user intervention necessary during this process. It proceeds automatically based on the configuration parameters entered into the panel.

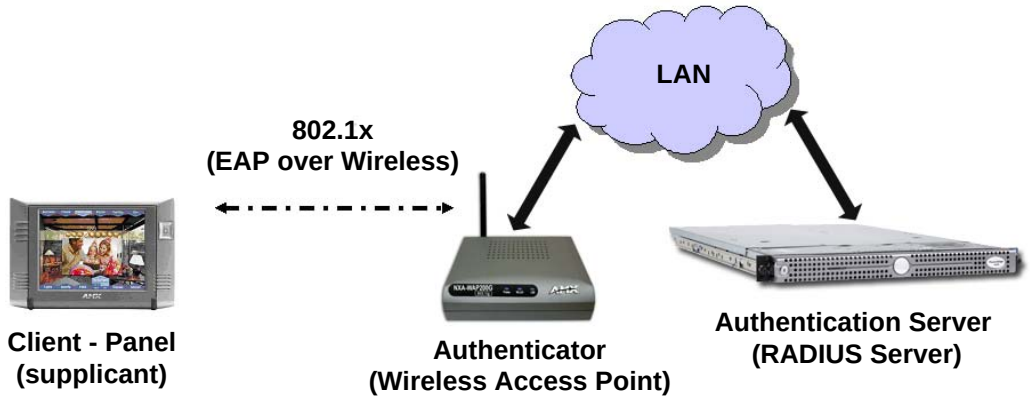


FIG. 77 EAP security method in process

1. The client (panel) establishes a wireless connection with the WAP specified by the SSID.
2. The WAP opens up a tunnel between itself and the RADIUS server configured via the access point. This tunnel means that packets can flow between the panel and the RADIUS server but nowhere else. ***The network is protected until authentication of the client (panel) is complete and the ID of the client is verified.***
3. The WAP (Authenticator) sends an "EAP-Request/Identity" message to the panel as soon as the wireless connection becomes active.
4. The panel then sends a "EAP-Response/Identity" message through the WAP to the RADIUS server providing its identity and specifying which EAP type it wants to use. If the server does not support the EAP type, then it sends a failure message back to the WAP which will then disconnect the panel. As an example, EAP-FAST is only supported by the Cisco server.
5. If the EAP type is supported, the server then sends a message back to the client (panel) indicating what information it needs. This can be as simple as a username (*Identity*) and password or as complex as multiple CA certificates.
6. The panel then responds with the requested information. If everything matches, and the panel provides the proper credentials, the RADIUS server then sends a success message to the access point instructing it to allow the panel to communicate with other devices on the network. At this point, the WAP completes the process for allowing LAN Access to the panel (possibly a restricted access based on attributes that came back from the RADIUS server).
   - As an example, the WAP might switch the panel to a particular VLAN or install a set of firewall rules.

AMX Certificate Upload Utility

The Certificate Upload utility gives you the ability to compile a list of target touch panels, select a pre-obtained certificate (uniquely identifying the panel), and then upload that file to the selected panel.

NOTE

This application must be run from a local machine and should not be used from a remote network location.

This application ensures that a unique certificate is securely uploaded to a specific touch panel. Currently, the target panels must be capable of supporting the WPA-PSK and EAP-XXX wireless security formats.

The Certificate Upload utility supports the following capabilities:

- Ability to browse both a local and network drive to find a desired certificate file.
- Ability to create a list of target AMX G4 touch panels based on IP Addresses
  Compatible panels include: MVPs, NXD/T-CV10 and NXD/T-CV7,
- Ability to display the IP Address of the local computer hosting the application.
- Ability to load a previously created list of target touch panels.
- Ability to save the current list of target Modero panel as a file.
- Ability to track the progress of the certificate upload by noting the current data size being transmitted and any associated error messages (if any).

The Certificate Upload Utility recognizes the following certificate file types:

- **CER** (Certificate File)
- **DER** (Distinguished Encoding Rules)
- **PEM** (Privacy Enhanced Mail)
- **PFX** (Normal Windows generated certificate)
- **PVK** (Private Key file)

Configuring your G4 Touch Panel for USB Communication

For a personal computer to establish a connection to a Modero panel via USB, the target computer must have the appropriate AMX USB driver installed. This installation is bundled into the latest TPDesign4 and NetLinx Studio2 software setup process or can be downloaded independently from the main Application Files page on www.amx.com.

NOTE

Close the Certificate Upload Utility before configuring the touch panel's USB driver. Only after the panel has been successfully setup to communicate via USB can you then re-launch the utility.

Step 1: Setup the Panel and PC for USB Communication

1. If you do not currently have the latest version of TPDesign4, navigate to **www.amx.com > Tech Center > Downloadable Files > Application Files > NetLinx Design Tools** section of the website and locate the AMX USB Driver executable (AMX USBLAN Setup exe).
2. Download this executable file to a known location on your computer.
3. Launch the Setup.exe and follow the on-screen prompts to complete the installation.

Step 2: Confirm the Installation of the USB Driver on the PC

The first time each AMX touch panel is connected to the PC it is detected as a new hardware device and the USBLAN driver becomes associated with it (panel specific). Each time thereafter the panel is "recognized" as a unique USBLAN device and the association to the driver is done in the background. When the panel is detected for the first time some user intervention is required during the association between panel and driver.

1. After the installation of the USB driver has been completed, confirm the proper installation of the large Type-A USB connector to the PC's USB port, and restart your machine.

NOTE

If the panel is already powered, continue with steps 3. The panel MUST be powered and configured for USB communication before connecting the mini-USB connector to the panel's Program Port.

2. Connect the terminal end of the power cable to the 12 VDC power connector on the side/rear of the pane, and supply power. If using an MVP that is installed onto a docking station, feed power to the docked panel by connecting the appropriate power supply to the docking station.

3. After the panel powers-up, access the firmware setup pages by either:
   - **MVP** - Pressing and holding the two lower buttons on both sides of the display for 3 seconds.
   - **CV7/CV10** - Pressing the grey Front Setup Access button for 3 seconds.
4. Select Protected Setup > System Settings (located on the lower-left) to open the System Settings page.
5. Toggle the blue *Type* field (from the Master Connection section) until the choice cycles to **USB**.
   - The connection remains RED after changing the communication from Ethernet to USB until the panel is rebooted.
   - Once the panel restarts, the connection turns a dark green until connected to an active USB cable.
6. Press the **Back** button on the touch panel to return to the Protected Setup page.
7. Press the on-screen **Reboot** button to both save any changes and restart the panel. Remember that the panel's connection type must be set to USB prior to rebooting the panel and prior to inserting the USB connector.
8. **ONLY AFTER** the unit displays the first panel page, **THEN** insert the mini-USB connector into the Program Port on the panel.

- It may take a minute for the panel to detect the new connection and send a signal to the PC (indicated by a green System Connection icon). If this is your first time installing the USB driver, a USB driver installation popup window appears on the PC.

9. Complete the USB driver installation process by clicking **Yes** and then installing the new AMX USB LAN LINK when told that a new USB device was found. This action accepts the installation of the new AMX USB driver.
10. Reboot the panel. Once restarted, the panel is now configured to communicate directly with the PC.

NOTE

The mini-USB connector MUST be then plugged into an already active panel before the PC can recognize the connection and assign an appropriate USB driver. This driver is part of both the NetLinx Studio and TPDesign4 software application installations.

11. Launch the Certificate Upload Utility and confirm the utility has detected the new USB connection to the panel:
    - Click on the ***Local Address*** field's drop-down arrow.
    - Confirm the new USB entry shows up in the list as: **10.XX.XX.1**.

How to Upload a Certificate File

1. Install the latest AMX USB LAN LINK driver onto your computer by installing the latest versions of either TPDesign4 or NetLinx Studio2. This USB driver prepares your computer to properly communicate with a directly connected G4 touch panel (MVP/CV7/CV10).
    - Refer to Step 1 from within the previous *Step 1: Setup the Panel and PC for USB Communication* section on page 168.
2. Access the target panel's Protected Setup firmware page and configure the USB communication parameters.
    - Refer to Step 2 from within the previous *Step 2: Confirm the Installation of the USB Driver on the PC* section on page 168.
3. With the panel successfully communicating with target computer, launch the Certificate Upload Utility.
    - Familiarize yourself with the User Interface options (Certificate Utility User Interface).
4. Locate your certificate file by using the **Browse** button and navigating to the desired file type.
5. Use the drop-down arrow in the *Local Address* field to select communication through either the computer's Ethernet port (Internet communication) or via the USB port (direct connection). If using an Ethernet connection skip to step 8.
6. **For a USB connection**, select the ***10.XX.XX.1*** IP Address which corresponds to the virtual IP Address assigned to the USB connection port on the computer.
7. **For a USB connection**, navigate to the *Add IP Address* field (bottom-right of the interface) and enter a value of **1** greater than the virtual USB IP Address.
    - For example: If the virtual USB IP Address is **10.0.0.1** then you would add an address for the directly connected panel of **10.0.0.2** (this is one greater than the USB address value detected by the utility).
    - **You can send a certificate to ONLY ONE directly connected panel (via USB)**. If using the Ethernet port's IP Address, you can send a server certificate to multiple target panels.
8. **For an Ethernet IP Address connection**, select the IP Address which corresponds to the local computer's Ethernet address.
9. Navigate to the *Add IP Address* field (bottom-right of the interface) and enter the IP Addresses of the various target touch panels.
10. Click the **Add** button to complete the entry and add the new IP Address to the listing of available device IP Addresses. Repeat this process for all subsequent device IP Addresses.
11. Once your list is complete, click on the **File** drop-down menu and select the **Save** option to launch a Save dialog where you can assign a name to the current list of addresses and then save the information (as a TXT (text) file) to a known location.

This application must be run from a local machine and should not be used from a remote network location.

12. Select the target devices which be uploaded with the selected certificate. These can either be:
    - individually selected by toggling the box next to the Send entry (with the Type column).
    - selected as a group by clicking on the Check All radio box located at the top of the device IP Address listing.
13. When you are ready to send the certificate file to the selected panels, click the **Send** button to initiate the upload.
    - Once the *Status* field for each entry reads **Done**, your upload was successfully completed.

The AMX Certificate Upload Utility is intended to be used for only one certificate at a time on the touch panel, and has no indicator that a certification has been loaded onto a touch panel. After a certification has been loaded onto a panel using the Certificate Upload Utility, you should immediately enter the certificate name (including file extension) into the *Client Certificate* field for the specified SSID. Make sure to double-check that the Security Type is correct.

Erasing All Certificates From the Touch Panel

Individual certificates may not be removed from the touch panel. However, all certificates may be removed from the device by using the *erase cert* telnet command, Certificates may then be re-uploaded, using the AMX Certificate Upload Utility as needed.

Appendix C: Troubleshooting

This section describes the solutions to possible hardware/firmware issues that could arise during the common operation of a Modero touch panel.

Checking AMX USBLAN Device Connections via Windows Device Manager

AMX USBLAN driver information can be confirmed in two different ways:

- Via the Control panel (steps 1 and 2) or
- Via the **Unplug or Eject Hardware** icon from the taskbar.

1. Navigate to **Start > Settings > Control Panel >** and double-click the **System** icon to launch the System Properties dialog.
2. Select the **Hardware** tab and click on the **Device Manager** button to launch the Device Manager dialog.
   - Within the *Device Manager* dialog, the AMX USBLAN device appears under Network Adapters (FIG. 78) and has a unique name such as AMX USB LAN LINK #2. The number changes depending on which recognized panel is currently connected.

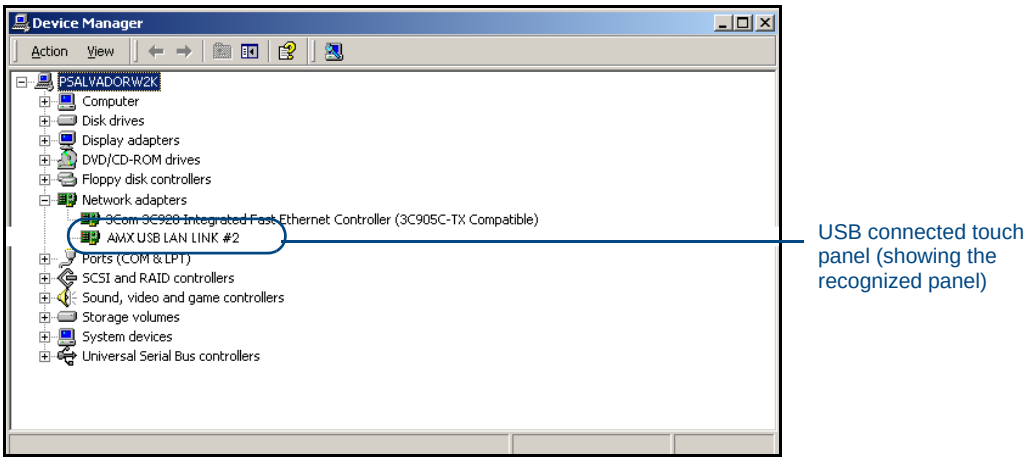


FIG. 78 Device Manager dialog showing USB device

3. Confirm that a new USB detection icon (FIG. 79) appears in the lower-right taskbar on the PC display window.
4. Double-click on the icon to open the **Unplug or Eject Hardware** window and confirm the AMX USB LAN LINK has been installed and is operating properly.
5. Click the **Properties** button to view further information about the installed USB driver.

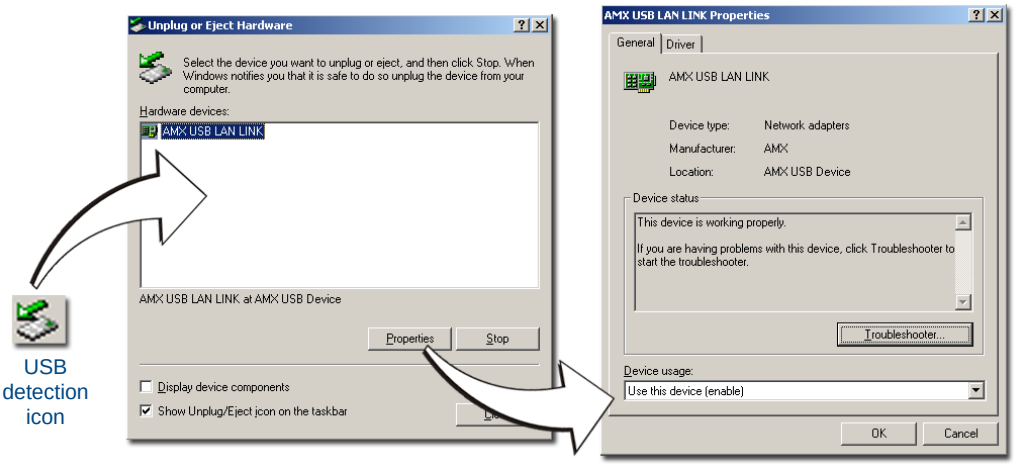

USB detection icon
Unplug or Eject Hardware
Select the device you want to unplug or eject, and then click Stop. When Windows notifies you that it is safe to do so unplug the device from your computer.
Hardware devices:
AMX USB LAN LINK
AMX USB LAN LINK at AMX USB Device
Properties
Stop
Display device components
Show Unplug/Eject icon on the taskbar
AMX USB LAN LINK Properties
General
Driver
AMX USB LAN LINK
Device type: Network adapters
Manufacturer: AMX
Location: AMX USB Device
Device status
This device is working properly.
If you are having problems with this device, click Troubleshooter to start the troubleshooter.
Troubleshooter...
Device usage:
Use this device (enable)
OK
Cancel

FIG. 79 USB Properties windows (Windows Device Manager)

If there is a yellow exclamation point next to the AMX USB LAN LINK device (within the hardware devices section of the Unplug or Eject Hardware window), stop and close the USB operation. Reconnect the USB cable to the panel and repeat the setup procedures.

To remove the USB driver association from a previously connected touch panel, you must navigate back to the Device Manager, right-click on the panel's USB driver (example AMX USB LAN LINK #2) and select **Uninstall** from the context menu and then **OK**.

- Once the system completes the removal of the device, the Device Manager window will refresh, and the device will no longer appear.
- The next time this device is connected to the computer it will appear as a new hardware device and will need to be associated again with the driver (refer to *Configure the panel for USB communication* section on page 24).

NOTE

A mini-USB connection is only detected after it is installed onto an active panel. Connection to a previously powered panel which then reboots, allows the PC to detect the panel and assign an appropriate USB driver.

Checking AMX USBLAN Device Connections via NetLinx Studio

Use the CC-USB Type-A to Mini-B 5-wire programming cable (**FG10-5965**) to provide communication between the mini-USB Program port on the touch panel and the PC. This method of communication is used to transfer firmware KIT files and TPD4 touch panel files.

1. Verify this direct USB connection (Type-A on the panel to mini-USB on the panel) is configured properly using the steps outlined in the previous two sections.
2. With the panel already configured for USB communication and the Virtual Master setup within NetLinx Studio, its now time to verify the panel is ready to receive files.
3. Click the **OnLine Tree** tab in the Workspace window to view the devices on the Virtual System. *The default System value is one*.
4. Right-click on the System entry (**A** in FIG. 80) and select **Refresh System**. This causes a refresh of all project systems, establishes a new connection to the Virtual Master, and populates the System list with devices on your particular system.

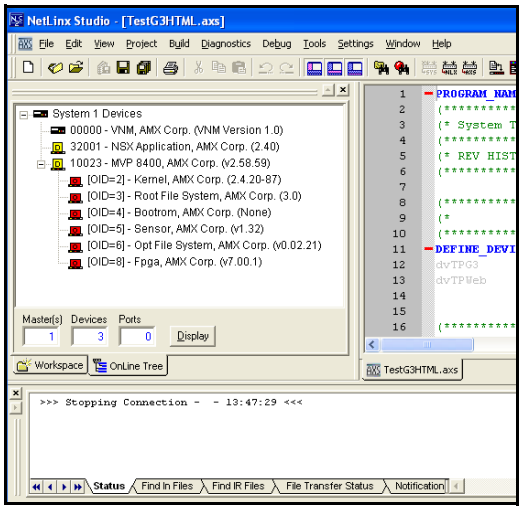

NetLinx Studio - [TestG3HTML.axs]
File Edit View Project Build Diagnostics Debug Tools Settings Window Help
System 1 Devices
00000 - VNM, AMX Corp. (VNM Version 1.0)
32001 - NSX Application, AMX Corp. (2.40)
10023 - MVP 8400, AMX Corp. (v2.58.59)
[OID=2] - Kernel, AMX Corp. (2.4.20-87)
[OID=3] - Root File System, AMX Corp. (3.0)
[OID=4] - Bootrom, AMX Corp. (None)
[OID=5] - Sensor, AMX Corp. (v1.32)
[OID=6] - Opt File System, AMX Corp. (v0.02.21)
[OID=8] - Fpga, AMX Corp. (v7.00.1)
Master(s) Devices Ports
1 3 0
Display
Workspace
OnLine Tree
TestG3HTML.axs
>>> Stopping Connection - - 13:47:29 <<<
Status
Find In Files
Find IR Files
File Transfer Status
Notification

FIG. 80 Using USB for Virtual Master communication (NetLinx Studio)

USB Driver

Symptom: *My USB driver has a yellow exclamation point and doesn't appear to be working.*

The USB driver was incorrectly installed and should be re-installed:

1. Power up the panel without connecting the USB cable.
2. Plug in the USB cable into the G4 panel. You should see a USB icon show up in the System Tray.
3. Double click on the icon to bring up the list of USB devices. The "AMX USB LAN LINK" device should appear in the list.
4. If the "Install Driver" dialog doesn't appear automatically, select the *Properties* button and then the *Update Driver* button.
5. When the Install Driver dialog does appear, click *Next* to accept all the default prompts.

   The OS will notify you that the driver you are installing/updating does not have a digital signature. This is acceptable, agree to continue the installation.

After installation is complete, the exclamation point will disappear. If this does not solve your problem:

1. Try re-installing the latest version of either NetLinx Studio 2 or TPDesign4. The necessary driver is downloaded to the PC as part of the software installation procedure.
2. Repeat the above procedures.

Panel Not in Listed as a Connected Device

Symptom: *My panel is not showing up in the Virtual Master's System list of connected devices.*

If a Virtual Master was already connected to the target panel, the G4 panel retains the information of the previous Virtual Master System number.

1. Power up the panel without connecting the USB cable.
2. Configure NetLinx Studio for a Virtual Master connection.

   Note the *System Number* used in the Edit Settings window.
3. Stop communication on the Virtual Master (*Settings* > *Stop Communications*).
4. Click *Yes* to stop communication.
5. Select the System Number (from the Online Tree tab) and use a right mouse click to select *Refresh System*. This re-establishes communication with the Virtual Master.
6. Plug-in the mini-USB cable into the corresponding port on the panel.
7. Wait a few seconds and refresh the system. This re-establishes communication with the Virtual Master. The panel should now appear in the list of available devices.

Connection Status

Symptom: *My Connection Status button isn't blinking and it says the USB is connecting.*

"USB Connecting" is displayed when the panel is trying to establish USB communication with the PC (either within the NetLinx Studio or TPDesign4 applications) but not establishing the connection.

1. Remove the USB connector from the panel and close any AMX applications.
2. Reboot the panel.
3. Launch the AMX application and attempt to reconnect to the panel.
4. If using Studio for Virtual Master communication, establish a Virtual Master connection, verify the correct System number, stop communication with the Virtual Master, and then re-establish communication by refreshing the system.
5. After the first page appears, re-connect the mini-USB connector to the panel and confirm the appearance of the USB icon in the System Tray.

Panel Doesn't Respond to Touches

- Verify that the protective laminate coating on the LCD is removed before beginning any calibration process.
- The protective cover acts to press on the entire LCD and makes calibration difficult because the user can't calibrate on specific crosshairs when the sheet is pressing on the whole LCD.

Batteries Will Not Hold or Take a Charge

Symptom: *Batteries will not hold or take a charge and there is no indication of charging, on the bargraphs or in the Batteries Setup page.*

To keep the batteries from being damaged (from operating at too low a level), the firmware places them into a protected state.

The panel must have the latest firmware (if it doesn't, the firmware can be found at amx.com, in the Dealers/Tech Center > Firmware Files.> Modero).

1. Load the firmware into the panel, using NetLinx Studio.
2. After loading the firmware, power cycle the MVP (this is a complete power cycle, not a Reboot). The panel will now show the current firmware version within the Setup > Panel Information page.
3. Connect the power supply to the panel. You will see 2 warning messages on the display.
   - The first one warns that the batteries are low and must be charged.
   - The second warning tells you that the second battery is in protected mode, and needs to be inserted into the first battery slot.
4. Swap the batteries, the top slot is considered the first slot, and now the batteries will be reset.
5. Wait a few minutes and then check the Batteries page on the MVP to see any charging activity on the bar graphs.

   The "Sensor" device (in the Online Tree tab below the MVP panel) should show v1.24 or higher after the upgrade, as shown in FIG. 81:

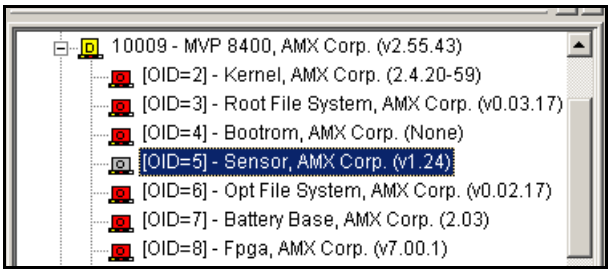

10009 - MVP 8400, AMX Corp. (v2.55.43)
[OID=2] - Kernel, AMX Corp. (2.4.20-59)
[OID=3] - Root File System, AMX Corp. (v0.03.17)
[OID=4] - Bootrom, AMX Corp. (None)
[OID=5] - Sensor, AMX Corp. (v1.24)
[OID=6] - Opt File System, AMX Corp. (v0.02.17)
[OID=7] - Battery Base, AMX Corp. (2.03)
[OID=8] - Fpga, AMX Corp. (v7.00.1)

FIG. 81 "Sensor" device in the Online Tree tab

Modero Panel Isn't Appearing in The Online Tree Tab

1. Verify that the System number is the same on both the NetLinx Project Navigator window and the System Settings page on the Modero panel.
2. Verify you have entered the proper NetLinx Master IP and connection methods into the Master Connection section of the System Settings page.

MVP Can't Obtain a DHCP Address

In requesting a DHCP Address, the DHCP Server can take up to a few minutes to provide the address.

1. Verify that the WAP is configured to match the MVP panel Network Name (SSID) field, Encryption, Default Key, and Current Key string.

Remember that the Passphrase generator on the panel does not produce the same Current Key if using the same passphrase on the WAP.

2. In NetLinx Studio, select *Diagnostics* > *Network Address* and verify the System number.
3. If the *IP Address* field is still empty, give the Modero a few minutes to negotiate a DHCP Address and try again.

My WEP Doesn't Seem to Be Working

WEP will not work unless the same default key is set on both the panel and the Wireless Access Point (WAP).

For example: if you had your access point set to default WEP key 4 (which was 01:02:03:04:05) you must also set the Modero's Default WEP key 4 to 01:02:03:04:05.

NetLinx Studio Only Detects One of My Connected Masters

Each Master is given a Device Address of 00000.

Only one Master can be assigned to a particular System number. If you want to work with multiple Masters, open different instances of NetLinx Studio and assign each Master its own System value.

Example: A site has an NXC-ME260/64 and an NI-4000. In order to work with both units. The ME260 can be assigned System #1 and the NI-4000 can then be assigned System #2 using two open sessions of NetLinx Studio v 2.x.

Can't Connect to a NetLinx Master

Symptom: *I can't seem to connect to a NetLinx Master using NetLinx Studio 2.*

Select *Settings* > *Master Comm Settings* > *Communication Settings* > *Settings (for TCP/IP)*, and uncheck the "Automatically Ping the Master Controller to ensure availability".

The pinging is to determine if the Master is available and to reply with a connection failure instantly if it is not. Without using the ping feature, you will still attempt to make a connection, but a failure will take longer to be recognized.

If you are trying to connect to a Master controller that is behind a firewall, you may have to uncheck this option. Most firewalls will not allow ping requests to pass through for security reasons.

When connecting to a NetLinx Master controller via TCP/IP, the program will first try to ping the controller before attempting a connection. Pinging a device is relatively fast and will determine if the device is off-line, or if the TCP/IP address that was entered was incorrect.

If you decide NOT to ping for availability and the controller is off-line, or you have an incorrect TCP/IP address, the program will try for 30-45 seconds to establish a connection.

Only One Modero Panel in My System Shows Up

Symptom: *I have more than one Modero panel connected to my System Master and only one shows up.*

Multiple NetLinx Compatible devices (such as MVP panels) can be associated for use with a single Master. Each panel comes with a defaulted Device Number value of 10001. When using multiple panels, it is necessary to assign different Device Number values to each panel.

1. Press and hold the two lower buttons on both sides of the display for 3 seconds to open the Setup page.
2. Press the Protected Setup button (located on the lower-left of the panel page), enter 1988 into the on-screen Keypad's password field, and press *Done* when finished.
3. Enter a Device Number value for the panel into the Device Number Keypad.
   The default is 10001 and the range is from 1 - 32000.

Panel Behaves Strangely After Downloading a Panel File or Firmware

Symptom: *After downloading a panel file or firmware to a G4 device, the panel behaves strangely.*

If the panel already contains a large enough file, subsequent downloads will take up more space than is available and could often corrupt the Compact Flash. The demo file that typically ships with G4 panels is one such file.

Symptoms include:

- Having to repeat the download.
- Inability to make further downloads to the panel. May get "directory" errors, "graphics hierarchy" errors, etc., indicating problems with the Compact Flash.
- Panel will not boot, or gets stuck on "AMX" splash screen.

Other problems also started after downloading to a new panel or a panel with a TPD4 file that takes up a considerable amount of the available Compact Flash.

1. DO NOT download TPD4 files (of large size) over the demo pages, or any other large TPD4 file.
2. First download a small blank one page file to the G4 panel using the Normal Transfer option to send/download the page.
3. Reboot the device.
4. Do your regular file or firmware download.

Panel Fails to Charge in MVP-WDS

Should the panel fail, either the unit has no display or fails to boot passed the AMX logo, or does not charge in the MVP-WDS follow these steps:

1. One person must hold down the blue button on the front of the docking station.
2. While the button is held down, another person must pull the power to the docking station.
3. Reconnect the power.

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